Cucamonga Vineyard Co., et al, plaintiff.

In the Superior Court

OF THE

COUNTY OF SAN BERNARDINO, STATE OF CALIFORNIA.

DEPARTMENT ONE

Cucamonga Vineyard Co. et al., *Plaintiff*	
vs.	No. Vol. 7.
San Antonio Water Co. et al., *Defendant*	

HON. FRANK F. OSTER, Judge.

I. BENJAMIN, Official Reporter.

COUNSEL APPEARING:

For Plaintiff

For Defendant

ALPHABETICAL INDEX OF WITNESSES

	Vol.	DIRECT	CROSS	RE-DIRECT	RE-CROSS	RE-DIRECT
Chaffey, A. M.	7	3942				
Finkle, F. C.		3966				
" (Britt)			4116			
" (Waters)			4390			
" (Haskell)			4408			
" (Goodcell)			4526			
" (Curtis)			4615	4625		
" (Britt)					4657	
Trask, F. E		3930	3933	3939	3940	

-o-

INDEX OF SESSIONS

April 2, 1909, 3926
April 5, 1909, 4o12
April 6, 1909, 4092
April 7, 1909, 4194
April 8, 1909, 4310
April 9 1909, 4406
April 12,1909, 4492
April 13,1909, 4574

-o-

INDEX

ALPHABETICAL OF WITNESSES

	Vol.	DIRECT	CROSS	RE-DIRECT	RE-CROSS	RE-DIRECT
Chaffey, A. M.	7	3942				
Finkle, F. C.		3966				
"			4116			
" (Britt)						
" (Waters)			4390			
" (Beckell)			4408			
" (Goodsell)			4425			
" (Curtis)			4615	4628		
" (Britt)					4627	
Trask, F. E		3930	3933	3939	3940	

-o-

INDEX OF SESSIONS

April 2, 1909.	3926
April 3, 1909.	4012
April 6, 1909.	4092
April 7, 1909.	4194
April 8, 1909.	4310
April 10 1909.	4406
April 12, 1909.	4492
April 13, 1909.	4574

-o-

CHRONOLOGICAL INDEX OF WITNESSES.

	DIRECT	CROSS	RE-D.	RE-C.	RE-D.
ask, F. E.,	3930	3933	3939	3940	
affey, A. L.,	3942	3963			
nkle, F. C.,	3966				
" (Britt)		4116			
" (Waters)		4390			
" (Haskell)		4408			
" (Goodcell)		4526			
" (Curtis)		4615	4625		
" (Britt)				4657	

--- INDEX OF DOCUMENTARY EVIDENCE ---

Volume 7.

Offered by Defendants.

		Offered	Copy
	Statement Ownership of all Stock Duc.Vin. Co. from organization of Company to date	3926	3926
	Statement Ownership of all Stock Duc.Land and Ir.Co. from Organization to date,	3927	3928
	Various Extracts from Minutes of Cucamonga Fruit Land Co. (Test of A.M. Chaffey),		3942 et seq.
	Tabulation Various Water Measurements made by F. C. Finkle,	3966	3967
	Tabulation of Watershed Runoff (Finkle)		
	Cucamonga Canyon,		4005
	Deer Canyon,		4007
	Day Canyon,		4008
	San Antonio Canyon,		4009
7	Photograph 19th street Diversion,	4042	
8	U.S.Topographical Map, Cucamonga Quadrangle with markings by Finkle, Gravel Basin etc.,	4044	
9	Same, showing Hydrographic Contours,	4047	
0	Hydrograph showing Relation between Discharge from Lady tunnel and Water Elevation in Well No.9, and want of relation between these and Well No.3, for 1907,	4065	
1	Same, for 1908,	4068	
2	Same, showing fluctuations of discharge on east side of Red Hill, etc.,	4070	
3	Plan on Line A B (Finkle)	4595	
4	Section on Line A B (Finkle)	4601	
5	Sketch of Hypothetical Well in surface water conditions,	4645	

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co.,

Plaintiff

vs.

San Antonio Water Co.,

Defendant

Vol. 44.

Friday, Apr. 2, 1909.

I. BENJAMIN, Official Reporter

Friday, April 2, 1909. Forty-fourth Day.

--0--

Mr. McKinley: I have the table now as to the ownership of stock. It is stipulated that the ownership of all of the stock of the Cucamonga Vineyard Company from its organization June 13, 1895, to date, has been held as follows:

OWNERSHIP OF ALL STOCK OF CUCAMONGA VINEYARD CO., FROM ORGANIZATION, JUNE 13, 1895, to DATE.

I. W. Hellman 367 shares from June 13, 1895, to Dec. 22,1906.
372 shares from Dec. 22, 1906, to date.

J. Downey Harvey:
245 shares from June 13, 1895, to Jan. 21st, 1897.
57 1/2 shares from Jan. 21st, 1897, to Oct. 7, 1898.
82 1/2 shares from Oct. 7, 1898, to date.

Herman W. Hellman:
5 shares from June 13th, 1895, to Dec. 22nd, 1903

Lewis F. Weil:
125 shares from June 13, 1895, to July 27, 1896.
5 shares from July 27, 1896 to Mar. 1st, 1901.

Peter D. Martin:
5 shares from June 13, 1895, to date.

Max Meyberg:
248 shares from June 13, 1895, to Mar. 17, 1902.

Gustave Heimann:
5 shares from June 13, 1895, to date.

Leah Dreyfus:

26-1/2 shares from June 13, 1895, to Feb. 3, 1904.

120 shares from Feb. 3, 1904, to date.

Leah Dreyfus, Guardian:

93-3/4 shares from June 13, 1895, to Feb. 3 , 1904.

Eleanor Martin:

62-1/2 shares Jan. 21st, 1897, to Oct. 7, 1898.

100 shares from Oct. 7, 1898, to Jan. 27, 1905.

162-1/2 shares from Jan. 27, 1905, to date.

Winifred Martin:

62-1/2 shares from Jan. 21, 1897, to Jan. 27, 1905.

Estate of Anne Donahue:

62-1.2 shares from Jan. 21st, 1897, to Oct. 7, 1898.

E. B. Dreyfus:

5 shares from March 1st, 1901, to date.

Marco H. Hellman:

5 shares from March 17, 1902, to Dec.22, 1903.

Farmers & Merchants Bank, Los Angeles:

243 shares from March 17,1902, to March 4,1909.

233 shares from March 4, 1909, to date.

J. A. Graves:

5 shares from Dec. 22, 1903. to date.

John Alton:

5 shares from March 4,1909, to date

--0--

And that the ownership of all of the stock of the Cucamonga Land and Irrigation Company from the date of its organization on April 19, 1895, to date, has been and is as follows:

OWNERSHIP OF ALL STOCK OF CUCAMONGA LAND AND IRRIGATION COMPANY, FROM ORGANIZATION, APRIL 19, 1895, to DATE.

I. W. Hellman:

145 shares from April 19, 1895, to April 19, 1905.

150 shares from April 19, 1905, to date.

H. W. Hellman:

5 shares from April 19, 1895, to April 19, 1905.

Max Meyberg:

100 shares from April 19, 1895, to May 28, 1895.

5 shares from June 15, 1895, to May 19, 1898

Peter D. Martin:

100 shares from April 19, 1895, to April 24, 1895.

J. M. Graves:

50 shares from April 19, 1895, to April 22, 1895.

O. W. Childs:

100 shares from April 19,,1895, to April 22, 1895.

5 shares from April 22, 1895, to June 15, 1898.

Emeline Childs:

70 shares from April 22, 1895, to April 2, 1901.

61-2/3 shares from April 2, 1901, to date.

Emma S. Childs:

8-1/3 shares from April 22, 1895, to date.

Ruth S. Childs:

8-1/3 shares from April 22, 1895, to date.

Carrie M. Hicks:

8-1/3 shares from April 22, 1895, to April 24, 1895.

Frank S. Hicks:

8-1.3 shares from April 24, 1895, to date.

Stephen V. Childs:

8-1.3 shares from April 2, 1901 to date.

Stephen V. Childs, Trustee:

5 shares from Sept. 5, 1901 to date.

J. D. Harvey:

100 shares from April 24, 1895, to Jan. 23, 1897,

25 shares from Jan. 23, 1897, to Oct. 7, 1898.

35 shares from Oct. 7, 1898, to date;

Eleanor Martin:

25 shares from Jan. 23, 1897, to Oct. 7, 1898.

40 shares from Oct. 7, 1898 to Jan. 27, 1905.

65 shares from Jan. 27, 1905, to date.

Winifred Martin:

25 shares from Jan. 23, 1897, to Jan. 27, 1905.

Gustave Heiman :

5 shares from May 23, 1903, to date.

Leah Dreyfus:

50 shares from April 22, 1895, to date.

Farmers and Merchants Bank of Los Angeles:

100 shares from May 28, 1895, to June 13, 1895.

95 shares from June 13, 1895, to March 19,1898.

20 shares from March 19, 1898, to date.

Marco H. Hellman:

5 shares from March 19, 1898, to May 23, 1903.

R. M. Poindexter, Pledgee;

5 shares from Jan. 15, 1898, to Sept. 5, 1900

--0--

F. E. TRASK, recalled for the purpose of correcting his testimony, testified as follows:

Direct Examination.

Witness:

On page 2587, line 20, cut out the words "as flood water." It is a reference to a curve which I used in computing the run-off, and the curve gives the total run-off and not the flood run-off. I introduced those words here and they should not be there. I want to say that if I referred to that curve as giving flood run-off at any other point, it was incorrectly referred to. It gives the total run-off. I took that curve from the American Society publication. That is the only reference to that that I find which is incorrect, but there may be another.

Page 2730 cut out the words Water Company and insert "Canyon."

Page 2732, line 4, cut out "don't" and insert "do."

Page 2759, line 28, cut out the word "channel" and insert "tunnel."

Page 2780, line 2, cut out the word "as" and insert "that"

Page 2796, line 21, cut out the word "tunnel" and insert the word "canyon".

Page 2228, line 29, cut out the word assistance and introduce the word "resistance."

Page 2829, line 15, cut out the word "the" before "gravel" and insert "that."

Page 2847: line 29 cut out the word "east" and insert the word "west."

Page 2975, line 26, cut out "Haskell" and substitute "McPherson."

Page 2994, line 12, insert between "as" and "principle" the word "a".

Page 3060, line 11, where it says 66 inches it should be 166 inches.

Page 3064, line___, strike out San"Antonio."

Page 3066, line 5, change the word "Bog" to "Big".

Page 3073, line 12, strike out "no" and insert "a".

Page 3077, line 21, insert the word "in" before the word "contact."

Page 3148, line 25, strike out "original" and insert "ordinarily."

Page 3142, line 8, strike out "in reducing".

Page 3172, line 1, strike out "day" and insert "dam".

Page 3183, line 20, strike out "of" and insert "upon."

Page 3185, line 6, cut out the word "whatever" and insert "wherever"

Page 3231, line 1, cut out the last word "in" and insert "above.

Page 3250, line 20, before the word "inches" insert the figures "67.85"

Page 3290, line 25, after the word "formation" insert the word "begins" and cut out the word "following there".

Page 3295, line 18, strike out "transportation" and insert "transition."

Page 3332, line 27, strike out the word "any" and insert "a". And change the word "what" to "that" in the same line.

3369, line 18, cut out the word "starter" and insert "strata

Page 3371, strike out "was" and insert "were"; and in line 16, at the end of the line, add the word "again".

Page 3384, line 26, strike out the word "that" before "it" and insert the word "as".

Page 3402, line 15, cut out the last word and insert " ".

Page 3410, line 15, cut out the word "of"

Page 3452, line 19, change "interdependence" to independence".

Page 3468, under the heading #9, on the next to the last line, 1313.1 should be 1333.1.

And the last figures in the column under date of January 9, 1908, at the foot of column 2, the figures are 1374.5 a and should be 1378.5.

There should be two corrections made in tabulations which I have presented. Those corrections will be the result of analyses of Judge Britt as giving the factors which enter ~~to~~ into certain tables. The analyses which were brought out by Judge Britt on page 3054, in the details which made up the total for the year 1902, my revised figures gave a total of 193.6 inspead of 195 inches for that year as shown in this table on page 2562. If you will look at page 2562 for the year 1892 the figures are 195 and should be crossed off and corrected by 193.6.

There is another one: Table on page 2563 under the column of East Side should be corrected for the year 1908 to read 268 inches instead of 261 inches. And that correction is made in accordance with the analysis of the details going into that measurement as found in the record on page 3219.

Those are all the corrections I have been able to find. Judge Britt asked for the cost of lifting water. I made a little estimate and will give the figures if you wish at this time, or leave it till later.

Mr. Britt: Go ahead.

A I made an estimate of the expense of lifting water 100 feet on the basis of pumping 90 inches on the basis of supplying to the land an inch to 3-1/3 acres, and I make an estimate of $23.09 per acre, or $23.09 per acre for an irrigation season of six months.

For 50 feet, if you will take half of that, it will be very close; and for 150 feet, add fifty per cent.

Cross Examination:

Mr. Haskell: Q What would be the cost of that for 50 inches at the same elevation?

A It wouldn't be much different; practically the same.

Q 25 inches?

A The smaller the amount of the lift, there would be some increase in cost, because the fixed charges would be constant and would have to be divided according to the number of inches.

Q Isn't it a matter of fact in pumping plants that if you lift only 25 inches that the cost of water per inch will be twice or three times what it will be where you lift 100 inches, or more where the supply is sufficient?

A That is not true, for this reason: Because at points where you get electric power you can put in a plant which would not require the continuous services of an operator. In that way you cut your expense down and you run without any large fixed charges for personal services.

Q Isn't it a fact that in practical operation you have to have a surplus of power over and above the amount of water you desire to lift?

A No large amount.

Q What would be the surplus power if you were lifting 100 inches?

A If I had known conditions I shouldn't put any surplus power to amount to anything; probably 10 or 15 per cent., so as not to overwork my machinery.

Q And if you only put 10 or 15 per cent. surplus power on, there would be times in the operation that you would not get the power to lift it?

A I don't think so, under modern methods.

Q Do you know as a matter of fact that these electric currents are varying and sometimes cease altogether for a few hours or a day?

A That would happen to any proposition, regardless of surplus power.

Q And the less power you order the greater that surplus has to be?

A I think not. It depends on your equipment entirely.

Q Do you know of any pumping plant in San Bernardino County that operates steadily without cessation with a surplus power of only 10 or 15 per cent. that lifts constantly through a single month of the year the same amount of water?

A I know of any amount of plants that do not have any surplus power at all. They take electric power and pay for what they consume.

Q You don't get your water then.

A You get your water when you are pumping; you pay for your power when you are using it and don't pay for it when you are not.

Q Suppose you have a given number of acres of ground and only a given quantity of water: You have to get the water there, don't you?

A Presumably.

Q Suppose you have a sufficient amount of ground that requires the entire flow of a well, 100 inches: You have got to have that water regardless of whether the power runs, or not, or else they suffer. Isn't that true?

A I think your question would require an answer in the affirmative; if you have that character of land conditions and you must have the water, you must have it.

Q It is a fact that nearly all of these underground supplies are taxed to their maximum now, are they not?

A No.

Q What one isn't?

A What one is?

Q Do you know of a single underground supply in Southern California that is not taxed to its maximum right now?

A I think there are plenty of them right around San Bernardino.

Q Where?

A I think the San Bernardino basin is not taxed to its maximum. Water is running out of it all the time.

Q At what time?

A Now.

Q It is in the winter season or non-irrigating season?

A If they drew it down deeper each summer it would retain more of the winter floods.

Q Your theory is to exhaust the basins so as to fill them up again?

A My theory is to utilize it and not allow the water to go to waste.

Q Where do you get your figures for pumping 100 inches of water 100 feet at a cost of $25 an acre during an irrigating season, or twenty-odd dollars during the irrigating season? On what do you base that calculation?

A On the cost of electric power.

Q What do you figure the cost of electric power to be?

A I think I figured the cost in that as two cents a kilowatt.

Q How much a horsepower?

A It would be a little more than-- I am not sure whether I used two cents per horsepower or two cents per kilowatt for that. A kilowatt would be practically one and a third horsepower. I made the computation some time ago and I can't say whether I used it on the horsepower basis or on the kilowatt basis; but I used the figure which the Ontario Power Company are charging some of its consumers, and it was either one or the other of the figures, and I worked it out on that basis and a charge for labor.

Q How many horsepower do you estimate it will require to lift 100 inches 100 feet?

A I haven't the detailed figures here; it is simply a

question of working out the number of pounds to be lifted to that elevation.

Q What is it?

A I will figure it out and bring it in to you if you wish. It will take a few minutes to do it.

Q Can't you tell that without--

A It is not a matter that I can carry in my head; I can make the computation.

Q It is just figuring the weight of a column of water--

A There are several factors; it is a very simple easy computation to make.

Q Why can't you give it to us? You have already made the figures.

A If you wish it figured out I can do it here or outside.

Q If it is going to take any length of time, you may do it outside.

Q Will you state your problem again?

Q How many horsepower do you figure it is necessary to operate a pumping plant that lifts 100 inches of water 100 feet continuously.

A On a 50 per cent. efficiency, which I have taken for the purpose of this computation, it would take an installation of about 45.4 horsepower.

Q Now did you add to that a certain amount of power surplus necessary to operate it successfully?

A That comes in in the efficiency coefficient I take.

Q You took 50 per cent.?

A I took the theoretical horsepower, Mr. Haskell, and allowed a consumption of about twice that as a factor cover-

the losses in the machiner and the necessary power for doing the work.

Q What was the theoretical horsepower?

A One-half of that, or 22.7; and I doubled that to cover those deficiencies.

Q What is the cost per horsepower that you figure?

A I think I used two cents per horse power or two cents per kilowatt hour.

Q That would be 98.8 cents per hour, wouldn't it?

A On that basis it would give 90.8 cents per hour for pumping that amount of water; for 24 hours you would get 24 times that.

Q What is that? A little over ~~21.79~~ $21 a day, isn't it?

A I make it $21.79.

Q What does it cost to install all that sort of plant to operate it for your wells, putting in your dynamo and fitting the well up for operation?

A That will vary, depending on where you put the well down.

Q You are lucky if you get it done for $4000 per well?

A You might get it done for that or half of that; it depends on where the water is and what depths you have to go. Those are all local problems.

Q And you haven't figured that into the cost at all?

A I judge from this estimate that I used 2 cents per kilowatt hour instead of horsepower hour, which would reduce that cost of power materially; and the estimates which I gave included the interest and sinking fund investments.

Q Do you know of any place in Southern California where you can buy power for less than two cents per horsepower for an hour? Are there any Los Angeles companies prepared to deliver it?

A I think the Ontario Power Company and I think some other electric companies in Southern California are selling power for 2 cents or less per kilowatt hour, which would make it considerably less.than 2 cents per horsepower.

Q Don't you know as a matter of fact that in practical operation that farmers have found it impracticable and unprofitable to lift water for agricultural or horticultural purposes more than 50 feet?

A I doxx not.

Q Don't you know that the only kind of farming that will support that lift is oranges or some product that isextremely profitable,-- where a great amount of product can be produced from a few acres?

A I know the crops you grow and the profits you make control the expense you are justified to go to in producing water for your property.

Re-Direct Examination.

Mr. McKinley: Q What relationship do the different elevations bear to eachother in the cost of lifting? I mean n ot what elevations, but different lifts.

A The higher your lift, the hi more excessive would be your unit cost. Your low lift would be the cheapest lift.

Q Do they bear any proportion to eachother?

A They don't bear a direct proportion. The statement which I gave was simply an approximation which I understood was

What 1 what Judge Britt asked for. Otherwise I should have brought
2 in all my figures. His question was for a reasonably close
3 approximation.
4 Q. Your first estimate was 100 feet?
5 A. Yes; I used my elevation as 100 feet and the amount
6 lifted as 90 inches.
7 Q. What would be the cost of lifting 50 feet? Mr. Curr says
8 you answered that question.
9 A. I made the general statement that lifting 50 feet would
10 take half that amount and 150 feet would add 50 per cent.,
11 and I said those were rough approximations, and that it
12 would vary at each particular point, and the class of machin-
13 ery will vary it somewhat from that; but that is a very
14 good estimate.
15 Q. Mr. Haskell inquired of you about territory on which
16 the draught was up to its maximum capacity: State whether
17 the draught in the Cucamonga formation is up to its maximum
18 capacity now?
19 Mr. Britt: Objected to as irrelevant and immaterial.
20 The Court: Overruled. Plaintiffs except.
21 Re-Cross Examination.
22 Mr. Britt: Q. Do you claim that you can lift 90 inches of
23 water 150 feet for 50 per cent. more expense than you can
24 lift the same water 100 feet?
25 A. Approximately that; and the same would apply to lift-
26 ing of water 50 feet instead of 100 feet. It wouldn't be
27 quite that ratio. That is, it is not a constant. In other
28 words, you have a larger investment the more you lift,
29 and in that sense you would have a larger fixed charge.

Q Does not the expense increase in geometrical ratio with the depth?

A That is another way of stating what I was getting at. There is a proportionate increase in expense and the figures which I gave are simply approximations.

Q That being so, I don't see how you can lift a given quantity of water 150 feet for 50 per cent. additional expense to the expense of lifting it 100 feet.

A I think it could be done within those figures. Those figures are quite liberal. You can produce steam power cheap enough to do that work on a large plant; you can't do it on a small plant. But with electric power at the rates for which it is selling in Southern California, those figures can be discounted.

Q Can you lift 90 pounds of water 200 feet for twice what it would cost for 100 feet?

A No; you can't increase the depth very far without adding materially to your estimate.

Q Can you lift it 300 feet for three times the cost of lifting 100 feet?

A No; you have to add a percentage for additional expense and the character of the work and the character of the machinery you have to install.

Q Does not the expense increase rapidly for each additional unit of distance?

A It would when you get above 200 feet.

Q Does not till you reach 200 feet?

A Well, it does not have the same ratio.

-oOo-

A. M. CHAFFEY.

A. M. CHAFFEY, a witness produced by defendants, being first duly sworn, testified as follows:

Direct Examination.

Mr. McKinley: Q. Where do you reside?

A. In Los Angeles.

Q. Have you any connection with the Cucamonga Fruit Land Company?

A. Yes, sir; I am president of the corporation.

Q. How long have you been president of the corporation?

A. Several years.

Q. You have with you the minutes of the Cucamonga Fruit Land Company?

A. Yes, sir.

Q. Will you produce those minutes? Referring to the minutes of 1895, the stockholders meeting, will you find that?

A. It must have been in the minute book prior to anything that I have, because this minute book on page 1 shows the meeting of the board of directors on June 4, 1895.

Q. Will you refer to the minutes of April 14, 1896? That is a directors' meeting.

A. Yes, sir.

Q. Do you minutes show what directors were present at that meeting?

A. H. W. Hellman, N. T. Stowell--

Mr. Britt: We object to the evidence as hearsay, incompetent, and irrelevant. It is incompetent as to any of the plaintiffs in the case or all of them together.

Mr. McKinley: We offer it for the purpose of showing knowledge of the officers of plaintiff corporations of the developments being made there in the Red Hills, and showing particularly their knowledge of particular developments by the fact that they took part in authorizing and contracting for them.

The Court: It is for the purpose of showing notice?

Mr. McKinley: Yes.

The Court: Overruled. Plaintiffs except.

Q State what directors were present.

A H. W. Hellman, N. W. Stowell, J. C. Lynch and E. T. Wright.

Q There is an item with regard to the Lone Star: Will you read from the motion there with regard to the Lone Star Tunnel?

A "Moved by N. W. Stowell, seconded by H. W. Hellman, that the Lone Star Tunnel be put in order and that $100 be spent in ditching the water bearing land to increase the water supply. Carried."

Q Will you refer to the minutes of May 4, 1896? First the stockholders meeting. What officers were elected at that time.

A Yes.

Q Will you read the statement of who were elected officers

A That is not a stockholders meeting-- The stockholders meeting followed; yes.

Q Show first what directors were present at the meeting of May 4, 1896.

A H. W. Hellman, N. W. Stowell, A. W. Gaylord and E. T.

Wright.

Q The officers were not elected at that meeting?

A The stockholders meeting followed it and then again another directors meeting.

Q State from the stockholders meeting what directors were elected on May 4, 1896.

A H. W. Hellman, I. W. Hellman, A. S. Gaylord, N. W. Stowell, J. C. Lynch, E. T. Wright, and Mrs. E. E. Bradley.

Q Now following within the directors meeting, what officers were elected at the directors meeting of May 4, 1896?

A H. W. Hellman, president; J. C. Lynch, vice president; E. T. Wright, secretary; the Farmers & Merchants Bank, treasurer.

Q Will you refer to the meeting of June 5, 1896, and find an estimate with regard to the tunnel, showing what directors were present?

A There is an interlineation June 5 interlined in E. T. Wright's handwriting, and the other writing is different. "A meeting at Farmers and Merchants Bank. H. W. Hellman, J. C. Lynch, N. W. Stowell and E. T. Wright.

Q Will you read the item in those minutes with regard to repairing the long tunnel?

A "Bids for cleaning out the bottom of the tunnel were received from O'Neil Brothers and Mr. Fuller at the price of $5 and $5.87-1/2 cents per foot for all excavation; after considerable discussion the following motion was carried: That N. W. Stowell be authorized to contract for the thorough repair of the long tunnel, he to pay all bills.

and to receive as pay therefor, in water, from the artesian well, now being bored by him, on the lands of this company, at a price of $600 per miners inch, at the well or in the event of their not being sufficient water obtained from said well to cover the expense of boring the same, and the expense of the tunnel, then Stowell to take water stock in the Cucamonga Water Company at a price of $60 per share enough to cover the entire expense of repairing said tunnel. Sd Said expense, in this resolution, is hereby limited to $5000. Mr. Stowell not voting."

Q Will you refer to the minutes of July 30, 1896?

A Yes, sir.

Q Will you read the item in regard to the long tunnel?

A "Moved by J. C. Lynch--

Q Who were present at that meeting?

A H. H. Hellman, N. T. Stowell, J. C. Lynch and A. T. Wright.

Q Now, if you will, read the item.

Mr. Britt: It is understood that the same objection is made, that it is irrelevant, incompetent and hearsay, and that it applies to all this line of testimony.

Mr. McKinley: That is satisfactory.

A "Moved by J. C. Lynch, seconded by A. T. Wright, that N. T. Stowell be authorized to make pipe to put long tunnel in good condition by piping and other work as he may see fit, he to receive pay for same from artesian well he is now boring, at price of $600 per inch at well. In the event that there is not water enough obtained from this well to cover the expense of additional work on tunnel over and

above the amount authorized at June meeting, then Mr. Stowell to carry amount for company until there are funds in treasury. Carried."

Q Will you now refer to minutes of September 18, 1906?

A Yes, sir.

Q State who were present at that meeting?

A H. T. Hellman, E. T. Stowell, J. C. Lynch and E. T. Wright.

Q Will you read an item contained there with respect to the tunnel?

A Report received from E. T. Stowell on work in tunnel and well. On motion duly seconded and carried Mr. Stowell was authorized to continue work with assistance of committee to be appointed by president. the president appointing Directors J. C. Lynch and E. T. Wright. Payment to be made in accordance with following proposition: E. T. Stowell to furnish what money will be necessary to extend tunnel no. 2 located on the west 22 chains of section 4, township 1 south, range 7 west, S.B.M. and take payment in water at $600 an inch, the water to be from said ~~develop~~ tunnel and from developments upon said land, to be delivered to him in perpetual flow at the mouth of the tunnel, together with a right of way through the tunnel for water, and also a right of way across said section 4 and section 5 for maintenance of pipes. In case of shortage of water and the failure of the Cucamonga Fruit Land Company to deliver the amount, E. T. Stowell to have theright to develop on the west 184 acres of section 4 sufficient water to make good all shortage, of course respecting the first right

of the Cucamonga Water Company to 225-1/4 inches from a portion of said 176 acres. W. W. Stowell not voting.

Q Will you refer to minutes of December 3, 1896?

A Yes.

Q Who were present?

A H. H. Hellman, W. W. Stowell, A. S. Gaylord and E. T. Wright.

Q Will you read the resolution referring to the water bearing lands?

A "The secretary was instructed to prepare and present a resolution defining water bearing land as intended to be included in 1887 at time of deed to Water Company (Dec. 1887); also, amounts each from the east and west sides as per measurements in 1890.

Q Will you refer to the meeting of January 2, 1897?

A Yes. H. H. Hellman, J. C. Lynch, W. W. Stowell, A. S. Gaylord and E. T. Wright present.

Q Refer to a resolution between the Cucamonga Fruit Land Company and W. W. Stowell.

A Prior to that resolution is a resolution making the agreement with the Cucamonga Water Company. Do you want that?

Q Oh, yes; I missed that. Will you read that?

A "On motion of J. C. Lynch seconded by A. S. Gaylord and duly carried, the following resolution was adopted: Resolved that the president and secretary are authorized to sign and execute ~~this~~ ~~note~~ for this company the following agreement." Then follows the agreement of January , 1897, between the Cucamonga Fruit Land Company and the Cucamonga

Water Company.

Q It will not be necessary to read that. That is the agreement already introduced in evidence, Mr. Britt.

Mr. Britt: Yes; I suppose it is.

Q Now with reference to another agreement there.

A On motion duly seconded and carried, Mr. Stowell not voting, the following resolution was adopted: Resolved that the president and secretary are authorized to sign and execute the following deed for this company:" Then follows the deed of the 30th of December, 1896, to H. W. Stowell.

Mr. Britt: Q Was this deed executed and delivered?

A I am sure I don't know.

Mr. Britt: The deed is new to me and it is somewhat lengthy, and without reading it through I am not quite prepared to say what figure it cuts.

Mr. McKinley: What page is that?

A 69.

Mr. Britt: It is not proposed to read it as evidence of the conveyance?

Mr. McKinley; No, sir.

Mr. Britt: This is already subject to the objection I made to the others.

Mr. McKinley: That is the paper set out in the minutes and is a deed dated the 30th day of December, 1896, by the Cucamonga Fruit Land Company, a corporation, to H. W. Stowell, witnessing, that whereas the party of the first part if the owner of the northwest quarter of section 4, township 1 south, range 7 west, S. B. M., situated in the county of San Bernardino, State of California, upon which

said quarter section party of the second part has bored an artesian well, the party of the first part has heretofore agreed to convey to said party of the second part certain waters of said well upon certain terms and conditions; said well is situated as follows: At a point distant east 421 feet from a point on the west line of said section 4, township 1 south, range 7 west, which said point in said west line is distant south 1697.85 feet from the northwest corner of said section 4.

Then follows a recital "Now therefore", stating a consideration of $12,000.00, follows with a granting to party of the second part, his heirs and assigns forever, 20 inches of water measured under a four inch pressure, an inch being estimated and fixed at 12960 gallons, and defining what an inch is and so on. "And does also grant the said party of the second part, his heirs and assigns forever, the right perpetually to take and carry away said quantity of water from said well and to enter upon said premises for such purposes." Then follows after this grant as set out, another preamble:

"And whereas the party of the first part is now extending a tunnel towards said well, in a southerly direction, and may extend the same to said well and may tap said well at or about the level of said tunnel and discharge the water of said well into and through said tunnel, it is mutually covenanted and agreed that the said party of the first part may do so and that in such event the said second party may take the water to which he is entitled from or through such tunnel or pipe that may be laid in such tunnel. And it is further

agreed that said party of the first part, whether said tunnel is extended to said well or not, may turn the water to which he is entitled into said tunnel or the pipe that may be laid therein by means of a tunnel or shaft, and may carry said water through the said tunnel and pipe. In case said party of the first part or its assigns should develop by any means such as tunnels or wells or excavations within a radius of 100 feet of said well first above mentioned, and the said well should from any cause cease to flow or produce the said quantity of water herein conveyed to party of the second part, then from the water so developed or flowing from such wells, tunnels or excavations the deficiency in the flow is to be made good to party of the second part, and water to the amount so produced as aforesaid of said second party is to be delivered to said second party and allowed to flow to him, his heirs and assigns perpetually; it being the intention of these parties to grant to party of the second part out of any water flowing in such tunnel and pipes or excavations the quantity of water to which he is entitled as hereinbefore specified, whether the same is now developed and flowing or may hereafter be made to flow

And the said party of the first part does hereby grant to said party of the second part the right to enter upon said quarter section at all times to inspect said well and tunnels and to repair said well, and generally to do any and all acts that may be necessary or proper in the premises for obtaining said water and conveying the same over said premises; and does also grant to party of the second part, his heirs and assigns, a right of way for said water

to said well or tunnels over and through all that portion of said section 4, township 1 south, range 7 west, owned by said party of the first part, and described as follows" Then follows a description of certain rights of way which I do not think are particularly material in this case as to where they were.

"With the right to lay and maintain and repair any pipes, or aqueducts, said party of the second part, his heirs or assigns may lay or construct for said water; together with the right of entry at all times upon said section 4 and 9 for the purpose of such construction and maintenance of said pipe or aqueduct.

"To have and to hold the above granted water rights and privileges and rights of way for water, together with the appurtenances, to said party of the second part, his heirs and assigns forever." And it is followed by a witness clause in the usual form.

Q A resolution authorizing this, you say, was adopted?

A Yes, sir.

Q Now will you refer to the stockholders meeting of May 3, 1897?

A Yes.

Q What stockholders does it show were present at that time?

A The Farmers and Merchants Bank, by [illegible] W. Hellman, vice president, 520 shares. I [illegible] Hellman by [illegible] Hellman proxy, 330 shares. E. T. Wright, 10 shares. [illegible] Hellman, 50 shares. A. [illegible] Gaylord, 45 shares.

Mrs. E. E. Bradley by A. [illegible] Gaylord proxy, 550 shares.

Charles Lynch, 50 shares. Farmers and Merchants Bank, pledgee, by J. C. Lynch, proxy, 200 shares. National Bank of California, by J. C. Lynch, proxy, 150 shares. Mrs. Jenny L. Wicks by M. L. Wicks, proxy, 70 shares. N. T. Stowell, 200 shares; ~~being a majority~~ the above representing 1995 shares, being a majority of the capital stock of 2000 shares."

Q What directors were elected at that meeting?

A I. W. Hellman, H. W. Hellman, N. T. Stowell, A. T. Wright, J. C. Lynch, A. S. Gaylord and Mrs. Emeline B Bradley.

Q Is there any resolution as to the acts of the directors?

A It was moved by M. L. Wicks and seconded and carried that all acts, and proceedings, of the board of directors for the past year as shown by the minutes of said board be ratified and approved.

Q Now can you refer to the minutes of the directors following, and state what officers were elected?

A H. W. Hellman was elected President, A. T. Wright secretary and J. C. Lynch vice president, Farmers and Merchants Bank treasurer. That is the meeting of May 4, 1897.

Q Now will you refer to the minutes of July 31, 1897, and state, first, what directors were present?

A H. W. Hellman, N. T. Stowell, J. C. Lynch and A. T. Wright.

Q Is there a resolution at that meeting with regard to 20 inches on the west side?

A "Mr. Stowell made a verbal report of progress as follows: The first well on the Lone Star Tunnel was down 119 feet

with about 6 to 8 inches of water flowing; the work on tunnels progressing slowly. Moved by J. C. Lynch, second - ed by M. W. Stowell and carried that the agreement be rati-- fied as made by M. W. Stowell as follows: The company will pay to J. C. Conners or the Cucamonga Vineyard Company $4.00 per day for use of water, being from 40 to 48 miners inch- es , until August 15, payable when bill is rendered by Mr. Conners. Mr. Stowell stated that there was a shortage of wat- er on the west side and that he desired to take and use the 20 inches he purchased. On motion duly seconded and carried Mr. Stowell was authorized to try pumping with his steam engine from artesian well no. 2, and if he finds sufficient quantity of water he is authorized to pur- chase a gasoline engine and run it night and day.

Q Will you refer now to the minutes of April 7, 1897?

A Do you wish to show any changes in the board of directors?

A No; there is a change by which Mrs. Bradley resigned, but we won't bother about that.

A Meeting of April 7, 1897.

Q That must be '98. That must be a mistake in the date. It is April, 1898.

A Present H. W. Hellman, M. W. Stowell, G. Heimann and E. T. Wright. A request having been made to this company by the Cucamonga Water Company for the privilege of erecting pumps and pumping water from our artesian wells to obviate the scarcity of water caused by the dry season, it was moved and carried that the request be granted on condition of the payment by said Water Company of the sum of $6.00 per annum for this season.

Q Is there a stockholders meeting in there in '98?

A No; there is no stockholders meeting in '98.

Q Will you then refer to the minutes of Febr ary 2, 1899?

A Directors present, H. W. Hellman, N. T. Stowell, G. Heimann and E. T. Wright.

I should have stated that these meetings are held in the Farmers and Merchants Bank.

"Resolved that the Cucamonga Fru t Land Company, a corporation duly organized under the laws of the state of California, will sell to N. T. Stowell for the sum of $6000.00 10 miners inches of water, estimated as 129600 gallons per day, constant flow, said water to be furnished from the two artesian wells, one bored in '96 and one in '98, about 220 feet apart, located on the west 80 acres of the northwest quarter of section 4, township 1 south, range 7 west, S. B. M., andright to use Tunnel No. 2 some 3400 feet long to convey said water. Also, N. T. Stowell to have right to enter upon a certain portion of said land to obtain said quantity of water if the two wells do not furnish the above amount. Deed to be drawn similar to previous deed given by this company to N. T. Stowell for 20 inches of water in 1897. President and secretary authorized to sign deed;on completion of tunnel to 1896 well and in consideration of N. T. Stowell having advanced the money as shown without interest , be allowed to take the above 10 inches at once.

The secretary wasinstructed to write to J. C. Lynch and I W. Hellman asking if they could attend a meeting about February 15, to talk over water matters pertaining to the sale of water.

Q Will you refer to the meeting of February 15, 1899?

A Yes, sir; February 15, 1899; special meeting of board ofdirectors was held this day to consider sale of water to Ontario, and other business. Present, H. W. Hellman, president, I. W. Hellman, J. C. Lynch, N. W. Stowell and E. T. Wright, secretary. After some discussion it was moved by J. C. Lynch and seconded by E. T. Wright that N. W. Stowell be authorized to sell to the Ontario Water Company (Over the "Ontario" there are the initials in Mr. E. T. Wright's handwriting "S. A.")

Q Mr. Wright was the secretary at that time?

A Yes. "From 100 to 150 miners inches of water from land on sections 4 and 5 as designated on maps shown to the board, at $1000.00 per inch. Water to be paid for in installments when delivered, and the body of the land shown, 200 acres, to be held as first right for the amount sold if above 100 inches; and the Cucamonga Fruit Land Company not to be held responsible to deliver said water if from any cause it should fail, but Ontario Company to have the right to go on above 200 acres and make up the amount in any manner they saw fit. Water to be delivered on the west side of Cucamonga Fruit Land Company's land. Carried.

Q Is that all the matter in that meeting on that subject?

A There is an authorization to commence suit against the Class C people in Cucamonga.

Q Referring to the meeting of March 16, 1899.

A At Farmers and Merchants Bank. Present, H. W. Hellman, G. Heimann, N. W. Stowell and E. T. Wright. Minutes of February 2, and 15th, were read and approved. In accord-

ance with a resolution passed at the meeting held February 2, 1899, to sell 10 miners inches of water to N. W. Stowell for the sum of $6000, this corporation joins with N. W. Stowell in a deed to San Antonio Water Company in a deed conveying 30 inches of water, being the 20 inches sold by this corporation to N. W. Stowell by resolution dated January 22, 1897, and also the 10 inches agreed to be sold to N. W. Stowell on February 2, 1899; and the president and secretary are authorized to sign the following deed of this company, to-wit: Then follows the deed--

Mr. McKinley: That deed has already been introduced in evidence.

A It is dated the 8th day of April and it is between the Cucamonga Fruit Land Company and N. W. Stowell and the San Antonio Water Company as to the 30 inches.

Mr. Stevens: I think that is set out in the answer.

Mr. McKinley: Yes.

Q On April 6, 1899, Mr. Chaffey.

A That is the meeting of April 6, 1899, that I have just read.

Q Turn back to March 16 then.

A March 16, 1899, I read the resolution there and everything affecting it, and the deed-- Excuse me. There is a meeting of April 6, 1899. Present H. W. Hellman, G. Heimann, N. W. Stowell and E. T. Wright. The reading of the minutes of March 16 was dispensed with."

Then there is something about sale of water:

"On motion of N. W. Stowell seconded by E. T. Wright a resolution was adopted to sell water to the San Antonio

Water Company, and the president and secretary to sign deed for same, of which the following is a correct copy."

Q Then follows the deed of April 8, 1899?

A Yes, sir.

Mr. McKinley: It is set up in the answer, so there will be no dispute about that. It covers the 100 inches of water--

A 50 inches of water.

Q Is there something else there about a report from Mr. Stowell as to the sale?

A Yes; there was a verbal report-- this precedes the resolution which I have read. "There was a verbal report made by Superintendent Stowell to the effect that the sale of water to the San Antonio Water Company of 100 inches was closed; it would be necessary to proceed at once to lay pipe from mouth of tunnel to west side of company's land and also to extend one main tunnel, run one side tunnel through upper portion of lands, to tap the two artesian wells put down in '88, also to bore from 2 to 4 more wells. After some discussion it was thought best to push forward the water developments on these lines, but until deed or contract was signed with San Antonio Water Company, not to let the contract for tunnel or wells.

Mr. Britt: What is the date of this resolution?

A It is not a resolution, but a report by the superintendent, Mr. Stowell, to the board of directors on April 8, 1899.

The Court: Do the minutes show that the report was acted on in any way?

A It says that after some discussion it was thought best

to push forward the water development on these lines.

Q Minutes of May 4, 1899; stockholders meeting.

A Stockholders meeting held at Farmers and Merchants Bank, pursuant to by laws. Present, I. W. Hellman, 350 shares, by H. W. Hellman, power of attorney. H. W. Hellman, 50 shares. Farmers and Merchants Bank, 520 shares, by H. W. Hellman, vice president. E. T. Wright, 10 shares. M. W. Stowell, 555 shares. J. C. Lynch, 50 shares, by E. T. Wright proxy. A. M. Chaffey, pldgee,150 shares, by E. T. Wright, proxy. Farmers and Merchants Bank, 200 shares by E. T. Wright proxy. G. Heimann 10 shares.

Q What directors were elected at that meeting?

A I W Hellman, H. W. Hellman, G. Heimann, M. W. Stowell, J. C. Lynch, C? G. Johnson, and E. T. Wright.

Q Was a resolution passed ratifying the acts of the directors ?

A It was moved by G. Heimann seconded by H. W. Hellman and carried, that all acts and proceedings of the board of directors for the past two years as shown by the minutes of said board be ratified and approved, and in particular, the sale of 100 inches of water to the San Antonio Water Company as shown by copies of deeds in this minute book on pages 114 and 119.

Q Will you refer to the directors meeting following that on May 4, 1899, and state what officers were elected?

A H. W. Hellman, president. E. T. Wright, secretary. J. C. Lynch, vice president; Farmers and Merchants bank, treasurer.

Q Minutes of September 7, 1899.

A Present H. [illegible] Hellman, F. [illegible] Stowell, G. Heiman, E. T. Wright.

Q Anything with regard to San Antonio Water Company waters at that time?

A The secretary reported that on August 29 the delivery of the first 50 inches of water to the San Antonio Water Company was accepted and the ~~50,000~~ fifty $1000-bonds of t the San Anton o Water Company were delivered to H. W. Stowell, and are now in the Farmers and Merchants Bank to the credit of our company.

Here the Court takes a recess until half past one o'clock p. m.

---ooOoo---

Afternoon Session ; 1:30 P.M.

Direct Examination of .....Chaffey, Resumed.

Mr McKinley, Q Will you refer to your minutes of November 2nd, 1899, and state who were present?

A H. W. Hellman, N. W. Stowell, G. Heimann, and E.T. Wright.

Q Is there something in those minutes with reference to the sale of water?

A It is stated here that Superintendent Stowell reported that during the coming week the last fifty inches could be delivered officially; that it had been flowing to the San Antonio Water Company the last two months. Also that directors of the San Antonio Water Company were not ready to carry out their contract and pay cash for this last fifty inches as their expenses had been so great last season, they neither had the cash or bonds, but would give five notes for $10,000 each, due in one, two, three, four and five years, at six percent. interest, secured by the water. After some discussion secretary was instructed to write Mr. I. W. Hellman the facts in above matter, and await his reply before action was taken.

Q You were a director of the Cucamonga Water Company at one time?

A Not at the present.

Q You were at one time?

A Yes, sir.

Q You were not interested in the Cucamonga Fruit Land Company at any of the times you have testified to?

A At any of the times I have testified to I had no interest whatever in the Cucamonga Fruit Land Company.

Q Returning to the Cucamonga Water Company, at the period that you were a director, state whether that was subsequent to the putting down of the wells in the Y tunnel?

A Yes, sir.

Q State whether you ever took up with the Cucamonga Land and Irrigation Company, upon whose lands those wells were situated, the question of pumping the wells?

A I can't state that I took that up with the Cucamonga Land and Irrigation Company; but I talked to Mr. H. W. Hellman about it on at least two occasions, with another member of the board of the Cucamonga Water Company, who was with me.

Q What conversation did you have with Mr H. W. Hellman at that time?

Mr Britt: Objected to as irrelevant, immaterial and incompetent.

Mr McKinley, Q Do you know whether Mr H. W. Hellman was in charge and direction of those lands at that time?

A I do not know; I know that the Farmers' and Merchants' Bank generally had the say-so; you generally went to Mr Hellman or Mr Heimann for anything in connection with them.

Q What was Mr Heimann's position in regard to them?

A I don't know; he was an officer of the Cucamonga Land and Irrigation Company, but I don't know what.

Mr Britt: I move that the statements of the witness in the previous answer in regard to the Farmers' and Merchants' Bank be stricken out, as a statement or expression of opinion, and on the further ground that it is not responsive to the question.

Mr McKinley, Q Do you mean that you went there yourself?

A Yes, sir.

The Court: The motion to strike out will be granted; it will be stricken out as not responsive to the question.

Q State whether as a director of the Cucamonga Water Company you had to do business with the owners of those lands -the lands on the east side owned by the plaintiffs where the Cucamonga Springs and the Y tunnel are situated?

A Yes, sir.

Q What persons did you transact such business with?

A Mr H. W. Hellman, and occasionally with Mr Heimann.

Q State what if any conversation you had with Mr H. W. Hellman, with regard to pumping the wells in the Y tunnel?

Mr Britt: Objected to as irrelevant and incompetent, hearsay and immaterial.

The Court: Overruled.

Mr. Britt: Exception.

A In company with another director of the Cucamonga Water Company, on at least two occasions we called upon Mr Hellman and told him that the water was running down to such and extent that it should be supplemented if possible by pumping, and asked him if he or his company would bear half the expense of pumping the wells.

Q What reply did he make to you?

A He refused to do it; he said that they would allow the wells to be pumped entirely at the expense of the Cucamonga Water Company, but that they must get half the water without expense to them.

Mr Britt: We move to strike out the answer as it is demonstrated that it has no relevance or pertinence to the contro-

A. Yes, sir.

The Court: The ruling of which you will be grateful; it will be stricken out as not responsive to the question.

Q. Each member of a director of the Commonwealth Water Company you had to do business with the owners of Lower Lands who lived on the east side owned by the plaintiffs were the Commonwealth Petroleum and the T Tunnel are related?

A. Yes, sir.

Q. Each person did you transact such business with?

A. Mr. R. R. Wilson, and occasionally with Mr. Wilson.

Q. State what if any conversations you had with Mr. R. R. Wilson, with regard to getting the water to the T Tunnel?

Mr. Brown: Objection to as irrelevant and immaterial.

The Court: Overruled.

Mr. Smith: Exception.

A. In company with Mr. Wilson of the Commonwealth Water Company, we had talk in relation to water. That is Mr. Wilson was told that the water was running down in such and such and that it should be supplemented if possible by pumping, and asked him if he or his company could have the power of pumping the water.

Q. What answer did he make to you?

A. He replied to me that he was sure that they would allow me to pump sufficiently at the expense of the Commonwealth Water Company, but that they must get rid of the water without expense to them.

Mr. Smith: We move to strike out the answer as it is immaterial and it has no relevance to pumping at the wells.

very here

The Court: The motion is denied for the time being.

Mr Britt: Exception.

Q When was this conversation?

A I can't recollect the date definitely.

Q During what years were you a director?

A I can't remember that; I was a director for a long period.

Q What time did you begin to be a director?

A I think about 1899.

Q And what time did you cease to be a director?

A I would say from recollection probably about 1902 or 1903.

Q You are sure the conversation was during the time you were a director?

A Yes, sir.

CROSS EXAMINATION.

Mr Britt, Q At that time that you had that conversation was there water flowing from the Cucamonga Springs in any material amount?

A There was water flowing out of the Y tunnel.

Q Do you know what amount?

A I do not; it was relatively a small amount.

Q Was there water also flowing from the Cucamonga Springs or do you know?

A I can't answer that.

Q What well were you talking with Mr Hellman about pumping?

A The wells that connected with the Y tunnel.

Q Well, there were only two were there?

A I can't remember whether there were two or more; I know there were at least two.

Mr McKinley, Q. How near together were these conversations?
A. Within a month I should think.
Mr Haskell, Q. Did I understand you to say that Mr Hellman was at the time these conversations took place the owner of these wells in the Y tunnel?
A. No, sir; I didn't say that
Q. Did I understand you to say that he was a director of the Cucamonga Land and Irrigation Company at that time?
A. No; Judge McKinley said that; I didn't; I don't know whether he was or not; he was the man who assumed the responsibility of speaking with regard to the corporations affairs; that is all I know.
Q. You had no business transactions with him at that time did you?
A. What do you mean by business transactions?
Q. You did not consummate any deal or contract in relation to any land or water in and about Cucamonga?
A. No, not at that time; not at the period of the conversations I am testifying to.
Q. You don't know whether he was a director or owner of any interest, or an owner of the lands?
A. I can't say of my own knowledge that he was, no.
Mr Haskell: We move to strike out the testimony of the witness as irrelevant, immaterial and incompetent; it is particularly immaterial in this: that a man cannot be compelled to pump to supply water that naturally but for the interference of others would flow in springs.
Mr McKinley: The intervenor has nothing to do with this testimony; it is not addressed to him.

The Court: , The motion is denied.

Mr Haskell: Exception to the ruling of the Court.

-o-

Mr McKinley: I understand from Mr Stevens that it will be stipulated that the total amount of the Capital stock of the Cucamonga Fruit Land Company at all times was 2000 shares; that I. W. Hellman owned 400 shares from March 12, 1886 to April 26, 1893; 350 shares from April 26, 1893, to May 8, 1902. That Herman W. Hellman was the owner and held from April 26, 1893, to May 8, 1902, 50 shares. That the Farmers' and Merchants' Bank was the owner and holder of 400 shares from September 5, 1893, to January 3, 1894; 390 shares from January 3, 1894 to August 17, 1895, and of 520 shares from August 17, 1895, to May 8, 1902.

Mr Stevens: I will not agree to stipulate that that was the ownership; but that was what the books show.

Mr McKinley: Very well; that the books show that.

Mr Stevens: Yes; I have no knowledge of the facts one way or the other.

-o-

F. C. FINKLE

F. C. FINKLE, previously sworn, recalled by defendants for further direct examination, testified as follows;

DIRECT EXAMINATION.

Mr McKinley: There were some tabulations produced by Mr Finkle when he was on the stand yesterday; they have been examined by counsel on the other side, and I now offer them in evidence, and ask that they be copied into the record by the reporter.

Said tabulations are admitted in evidence, and are here extended into the record as follows, being:

TABULATIONS OF VARIOUS WATER MEAN RESULTS
MADE BY F. C. FINKLE:

uagings in Cucamonga Canyon and Gravel Basin North of Base Line ,

Inches 4" Pressure

ate	Cuca-monga Canon	Well No.5 N.of Base Line	Wells No. 7 & No. 8	Well No.1	Well No.4	Well No.2	Well No.3	Box C or all 16th Street Water	Totals
ug 20'97,126.40									126.40
ch 15'99		14.40							14.40
eb 5'00,100.31									100.31
eb 11'00,			122.60						122.60
eb 17'00,			109.45						109.45
ep 19'07			6[illegible].90	57.8	71.8				199.50
ov 22'08			57.85	55.5	90.4	79.95	76.8	366.00	360.50

Guagings on West Side of Red Hill at Cucamonga, Inches 4" Pressure.

Date	West Cien-ega	Tun-nel No.4	Lady Tunnel W.Side 90 A Tract	Well No.4 Lady Tunnel	Mouth of Lady Tunnel	8" Pipe Tiburcio Spring, Etc.	Total on West Side
Jan 15'99					96.40		
Mch 15'99	15.49	7.9	77.55	35.6	91.20	est.40.00	154.59
Apr 1'99	"	"	*73.45		103.37	est.24.00	150.76
Aug 25'99	3.32		#91.22	Wells No.5&6 33.33 F	166.19	0.55	205.39
Do.	5.32		92.40	Well No.5 2.66	158.10	0.55	166.63
Dec 13'99	5.09		127.35	Well No.5 1.76	147.91		154.76
Feb 4'00	3.91	1.49			126.04		131.40
Feb 11'00			°76.15	Well No.5 0.66	133.45	Picnic Str. 0.55	133.45
May 7'04			x196.60		184.25		
Jul 29'05			154.40		a241.05		241.05
Sep 19'07					b284.50		288.50
Jan 9'08					c229.95		229.95
Feb 2'08					d 67.85		67.85
Nov 22'08					e334.15		334.15

*April 1, 1899, 29.92 inches rising on 90 Acre Tract
#Aug. 25, 1899 56.93 " " " " " "
°Feb. 11, 1900 56.09 " " " " " "
xTotal from West Side could not be measured as weir of Cucamonga Water Co. was locked and water taken by it could not be ascertained.
a140.7 in. going to Ontario Colony & 100.35 in. going to Cucamonga Wat. Co.
b184.6 " " " " " " 99.90 " " " " " "
c154.0 " " " " " " 75.95 " " " " " "
d 34.54" " " " " " 33.31 " " " " " "
e250.05" " " " " " 84.10 " " " " " "

Since Jan. 29. 1907, discharge on west side has been controlled by the bulkhead in Lady tunnel

Note: On Dec. 13, 1899, 127.35 inches going to San Antonio Water Co. from Lady tunnel, and 20.56 inches to Cucamonga Water Co.

Guagings on East Side of Red Hill at Cucamonga, Inches 4" Pressure

Date	Creek Division Box	"Y" tunnel.	"Y" Tunnel Division Box	Lone Star Development.	Well Co.	Sunset wells	Sour-wine well	Total on East Side
				weirs 5&7				
Mch 15'99,	109.05	72.45	104.40	35.60				247.05
Apr 1'99,	107.25	72.60	98.20					205.45
Aug 25'99,	91.55		87.15					178.70
Dec 13'99,	106.55	58.10	81.30	20.50				208.35
Feb 3'00,				(17.06				235.43
Feb 4 '00,	97.06	54.87	77.22	Feb.3) (81.15				235.43
Feb 17'00,	90.30	53.60	72.90	16.63				179.83
*May 7'04,	13.88							
§Jul 29'05,	7.41							
Sep 19'07,	31.58			40.37	26.05	47.42	34.66	180.08
Jan 9'08,	39.80			124.75				164.55
*Feb 2'08,	47.50			15.05				
Nov 22'08,	33.64			95.55	22.57	43.17	x 35.00	229.93
Mch 15'09,	50.19		22.11	Bulkhead closed.				72.30

*Total on East Side not given as pumping plants and 35 Acre Tract supply could not be measured on account of locked weirs.
§Same conditions as May 7, 1904
*Pumping plants on East Side stopped after rains in January, 1908, hence total on East Side cannot be given.
xTaken from Plaintiffs' Exhibit 79.

The Court: One of the diagrams which was introduced while Mr Finkle was on the stand yesterday dealt with the underground flow as to the square root of the head; I am very much in the dark as to his theory; as I recall his testimony yesterday he said the theory on which the experts on the other side had proceeded did not involve the square root, which he says was the proper theory, and made reference to the fact that this was to some extent recognized by the authorities as the proper formula. I would like to have some further explanation in regard to that, because it becomes an important factor in this case as to whether that formula should be adopted.

Mr McKinley, Q Will you explain that matter more fully? First, explaining the theory of the plaintiffs' experts as you understand it has been presented?

Mr Britt: That is entirely a mistaken assumption that the witnesses for the plaintiffs ignored or denied the propriety of the natural law or theory as to this relation between hydraulic head and discharge - that it varies substantially in the manner as stated by Mr Finkle; I don't think that was at any time denied; they did claim that the hydraulic head at the wells above would affect the discharge below, but as for denying that the relation between hydraulic head and discharge is theoretically what Mr Finkle has stated here, I do not recall any such statement.

The Court: Do you then concede that is the correct formula used by Mr Finkle?

Mr Britt: I do not concede it is incorrect formula at all because what is called the coefficient as the witness states

is purely a matter of surmise.

Mr Haskell: I question the correctness of Mr Finkle's theory, as applied to the discharge of water percolating through the ground.

Mr Britt: It is not my purpose to concede the correctness of any such proposition; I say they are simply fighting a man of straw in stating that Mr Koebig or Mr Purcell denied that theoretically the discharge of water, or a fluid of the nature of water, varies as the square root of the hydraulic head; I don't think there was any such denial.

The Court: One other proposition: assuming that the experts all agree, I would like to know what they all agree about.

Mr McKinley: I suggest that Mr Finkle explain the theory of the other experts and then his theory.

A The manner in which I understood the theory of the other experts from listening to their testimony - -

Q Name them.

A Mr Koebig and Mr Purcell;-- both from listening to their testimony, as well as reading the record afterwards, was that they said the discharge of Cucamonga Springs varied as the hydraulic head on the 16th street wells, or elevation of water in the 16th street wells; it is true they did not deny anything about the square root, but they did not say anything about it; but they made the other statement which ofcourse would lead me to take it as varying directly with the head, not having said varying as the square root of the head; if they meant it varied really as the square root, there is no quarrel between us if that is what they meant.

The Court: As I recall it they put in some diagrams showing graphically the result of their theory.

A They did; which I will come to later.

Q Are those consistent with the square root theory?

A They ignored it altogether, and platted the head of the wells directly, as compared with the variations of the springs; all their diagrams proceeded on that theory; and therefore I think I am justified in assuming that that was their theory.

Now, ignoring that for the present, I wish to point out what a vast difference it makes whether you take it directly as a head, or the square root of the head: Assume that the hydraulic head on a discharging underground water supply is 100 feet, and on another underground water supply is 81 feet; there is a difference between the two of 19 feet as affecting the discharge, if you vary it directly as the head; on the other hand, if you extract the square root, the square root of 100 is 10; the square root of 81 is 9; which makes a difference of one, or one-nineteenth of what it is adopting the other method; that is a matter of great importance, and that was the reason I went into this, as it makes a great difference, and the difference becomes greater the further the two heads depart.

The graphic illustration which is shown on Defendants' Exhibit Z1, is not made on any assumed coefficient of resistance; it is made on a calculated coefficient of resistance, from the actual measured discharge of the springs, and from the actual measured hydraulic head at well number 7; and that observation was made on the 15th of December, 1899. It

is true that all of my calculations are based on that one experiment, but any one experiment is sufficient for determining the coefficient of resistance, if your measurements are correct. by applying results to the second formula, for M, shown on this diagram, I might have taken any other date as a starting point; I might have taken for example the date of July 29, 1905, when the water was the lowest, and from that measurement I might have calculated another coefficient of resistance, and had I done so, which in fact I did for all of these, and applied it, the discrepancy would be equally as great as it was by using the one that I did use. The point important in this regard is that having once determined by experiment the coefficient of resistance it is not variable after that; it is the same as taking a pipe leading from a reservoir, and if that pipe is 1000 feet long and 12 inches in diameter, and always remains a thousand feet long and 12 inches in diameter, the coefficient of resistance in that pipe will never vary, even if the head varies.

Mr Britt, Q Could you not have obtained experimentally the same result or formula - I don't say it would have been the same in terms but the same in form, if you had taken the elevation of a well in Redlands, and the discharge at the well on the same day?

A No, Judge Britt; because this coefficient of resistance that I have calculated applies only to the locality; the coefficient of resistance varies with the length of the saturated mass and the character of the material in it; now, a coefficient of resistance determined at Redlands would have no relation to this locality, because the condi-

tions of the soil might be very different, might be entirely different.

Q You assume that you know precisely the sort of soil through which this water was percolating?

A I don't care anything about what the soil is; I don't assume anything about it; I take it just as it is there, and I measure the discharge and I measure the head, and calculate the coefficient of resistance which applies to that.

Q You take the elevation of a well at a certain time, and the discharge at a certain time?

A That is it.

Q And thereupon yu assume or conclude that the coefficient of resistance is a certain amount?

A I don't assume; I calculate it from this formula; and if you can prove that that formula is technically incorrect, my calculation is wrong; if you can't prove that it is right.

Q In the same way that you take the elevation of that well, you could take the elevation of a well in Redlands, and the discharge there at the Cucamonga Springs on the same day, and thereupon from those elements compute the coefficient of resistance could you not?

A I fail to see what Redlands and the discharge of these Cucamonga Springs have to do one with the other, but I admit that there is not any more relation than there is between well number 7 and the springs, if that is what you mean. But that has nothing to do with the question; the question I am answering is this: Assuming that the hydraulic head as evidenced by the elevation of the water in well

number 7 does regulate the discharge, then this would be the coefficient of resistance; and the reason I make that assumption is because that was your theory.

The Court: As I understand it, your contention is a negative one: that the contention made on the other side is not warranted by the facts.

A That the contention made on the other side is not warranted by the facts. I say if you take a well at Redlands it would no more support their theory than this does, because this is a negative proposition all the way through; I claim well number 7 has nothing to do with this discharge.

Mr Britt, Q. I claim the coefficient of resistance is wholly an independent quantity, and it is computed just as readily between the discharge in the Cucamonga Springs, on a given date, and the hydraulic head, compared with some spring in the Rocky Mountains, as it is between the discharge of the Cucamonga Springs and the hydraulic head at the Y tunnel.

Mr McKinley: Your experts say there is a relationship; we say there is not.

A I would like to answer Judge Britt in that respect, as to this being any assumption or guess: if there were a relation between well number 7 and the discharge of the Cucamonga Springs, then this calculation which I have made would give you the correct coefficient, if you made your measurements correctly; to illustrate that, I might say this: Assume that you have a reservoir containing water, in which the water might vary 100 feet in depth; assume that from that reservoir you have a duct; now, that duct may be a pipe-line or it may be a flume filled with gravel and soil which is

enclosed, so the water could be under pressure, or it may be any other sort of a closed duct; if you have an outlet for that duct where the water emerges, and the water stands 50 feet in your reservoir above that point, and you measure the discharge at that point, measure the head of your reservoir, and calculate this coefficient M which I have given here, the result is not a guess or an assumption, or anything of the kind, but an actual fact determined by experiment.

Mr Britt, Q Precisely, because you know your conditions there.

A Yes, that is what I am coming to: there we know the conditions and that is the fact; now, if you were to raise the water in the reservoir, so that it stands 100 feet above the point of discharge, and you would again measure the discharge you would find that it would correspond with the first formula for Q, and you would find that your coefficient has remained exactly the same; there has not been any change in it; the only change is that which is due to the square root of the head, using the square root of 100 instead of 50. Now, if these conditions existed at this point you would find the same thing, and once having determined that coefficient, you could use it at any other time, and these two lines, the calculated line, and the observed line, would coincide.

Mr McKinley: If the discharge from the pipe did not correspond, you would begin to look for some other cause?

A You would find there was some other head that regulated it; the fact is that the head which regulates the discharge of the Cucamonga Springs is in the old formation instead of the new formation; that head we have not observed and measured;

mentioned, so the water would be rather pleasant, or it may be any other kind of a clever dodge, if you have an audit for instance there is the water company, and the water which is put in your mortgage during last month, and you measure the discharge at that point, measure the heat of the water, and calculate the modifications which I have just been, the result be more great or the assumption, or supposing or the plan, has to result from experiment by experiment.

Mr Smith, Q. Exactly, because you have your conditions there.

A. Yes, that is what I was trying to show to have the same dilution and that is the point; now, if you were to take the water in the reservoir, we find it exactly the same the point of discharge, and you would take because the discharge you would find that it would correspond with the first formula for, and you would find that you calculated as regards exactly the same; there has not been any change in it; the only change is that there is one in the point of the water, using the water from of the library of Mr. Smith, it has conditions exactly at this point so that it will be same river, and some having additional two modifications, you would see if it may make flow, and make the flow, the additional flow, and the reservoir flow, only reality.

Commissioner: If the discharge from the main did not decrease, you would begin at last the two flows meet.

Q. The only flow there was was when they had regulated it; the fact is that we have been using regulation the discharge of the Commissioner flows is in the activities during of the flow flowing, that was by the my commission on changing.

if we had we could determine the matter.

Mr Haskell, Q You are assuming that the cross-section through which this water passes on its way to the Springs to its outlet, whether it be where this pipe line is, or the winery, or above the winery, is always sufficient to let any quantity of water through it.

A I am assuming that when the head is the same that the cross section must be the same.

Q You are assuming that the cross section will let 500 inches go through it as readily and as freely as it will 50 under a certain head or pressure?

A I am assuming nothing of the kind. I assume that as long as the water in the reservoir is high enough to fill the cross section the cross section must remain the same; and the quantity coming down does not depend on the cross section, but on the resistance which is offered in the cross section as expressed by the coefficient m, as expressed on the diagram Z1.

Mr Britt, Q Do you not assume that you know where all the water emerges, and do you not assume that it emerges at the same point?

A I simply assume that the water emerges just as it always does on the east side - -

Q Scattered over half a square mile.

A - - and while I don't believe in that theory myself, the plaintiffs' experts did advance that theory. My theory is that the water is now emerging partly in the Lone Star tunnel, partly in the 35-acre tract and other artesian wells;. We have no means of telling where it is emerging or under

what hydraulic head. I am simply taking this to negative your theory; if the conditions were as you have stated then this kind of a calculation would prove it; not being so, this disproves it.

Mr Haskell, Q In this assumption that you have on this diagram, you assume that it all comes out at the intake of that pipe line?

A I assume that it comes out right where it has been measured, at the same point.

Q As a matter of fact, you know it does not come out there but comes out higher up.

The Court: This discussion was brought about by the Court asking a question simply to understand the theory of Mr Pinkle, and ofcourse on the regular cross examination you will be allowed to go into that matter fully if you so desire.

A If Mr Haskell will give me some other point from which to calculate a hydraulic head, I will calculate it from that and bring it in here; he says my point is not right; now let him give me one.

The Court: I would like to go back to the Kindergarten stage of this thing; yesterday in your elaborations of this calculation, you likened it to an object falling in space; I don't quite understand where the similarity comes in as regards the coefficient of resistance there; would you apply the same rule to the column of ~~air~~ water if it passed through the air?

A Yes, sir; I will explain this matter fundamentally, which may no doubt be very useful to us all; if you permit

a falling body to drop in vacuo, where there is no air, the formula, Q equals the square root of 2g times H, $Q = \sqrt{2GH}$, would express the velocity of that body at any point below where it was started, H being that distance, and Q being the velocity at that point. Now, if we drop the body through air, that formula would not give the correct result because there is an impedience or resistance from the atmosphere in dropping, and in order to determine that it would be necessary to drop that body through a certain distance; it might be only 10 and 20 or 100 feet and actually time it, so as to reverse this formula, and obtain the coefficient K which is the resistance of the air to the falling body; after having once obtained the coefficient for that body - it might not apply to other bodies, but would apply to this body or any other like it,- and having once obtained the coefficient it would apply to any height through which that body might drop.

The Court, Q That suggests another matter: the observed comparison of the body falling in vacuo, which I assume to be the basis of all this calculation, would seem to me to find its parallel, taking into consideration the coefficient of resistance, only where the body vertically falls: Is not the lateral extension to be taken into consideration at all?

A That is taken into consideration in the coefficient K.

Q In what way?

A That in the coefficient K is calculated; we have measured 187.85 inches as discharge; we have also measured the head 114.6 feet; that was the relation existing at that time;

a falling body to come to rest, since there is no air,
therefore, S finds his square rod of 8 times S.

S = [illegible] would suppose the velocity of that body on any point before there (if we neglect, S says) the friction, and S takes the velocity at that point. Now, if we drop the body through air, that friction would not alter the matter. Now friction would not alter the matter from the atmosphere in creation, and in order to make it equal to nothing at any rate, it would be necessary to say that body lengthen a [illegible]; it does in only 1/ [illegible] of the time but infinitely slow it, so as to preserve this result, and relate the modification [illegible] in the resistance of the air to the falling body, after having made [illegible] the resistance of the air [illegible] - it might not apply to other bodies, but would apply to this body by any other law [illegible] - and having then obtained the modification it would only be [illegible] which [illegible] right law.

The fourth, or that requires another notice: the measured motions of the body falling to [illegible], [illegible] is the result of all this activity, [illegible] the spiritual. During [illegible] the modification of resistance, only where the body originally falls: the [illegible] the [illegible] [illegible] [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

now by making this calculation for K it takes into account not only the distance and the resistance of the soil, but it takes into account all the resistances which impede the flow of the water. If there were no resistance you could eliminate your m, and the result would be obtained by the first formula. When you work the formula backwards you take into account every resistance met by that water percolating, if it is due to one mile, or ten miles, or compact clay or sand and gravel; whatever the resistance the sum total of all the resistances are expressed in this K, and that K will forever apply to that same condition, but would not apply to any other condition which is not exactly like it in every particular.

The Court, Q. As I assume, you take a certain well and a certain measurement from the springs and Y tunnel; ofcourse that is on the assumption that these conditions are permanent; you do not take into consideration in this calculation any such influences as rainfall or temperature or pumping of other wells.

A. No, sir. I am going this to answer the theory that the 16th street wells cause the rise and fall of the Cucamonga Springs, and ignoring every other factor which I believe does cause those things.

Q. I was anxious to find out what your theory was, because I assumed you would use it later on in some other theories within your advance.

The theory is that if the pumping of these wells was responsible for the decline, then the decline would have been as shown by my calculated line instead of as it really occurred.

Mr McKinley, Q Will you finish your description of the geologic formations and their effect on the underground waters?

A Referring to the diagram, defendants' exhibit 23, the older formation, designated by CC on this diagram, which is folded in the form of an arch, conducts this water from the point where it is received at the upper end to the lower point where it may be tapped by wells or emerge at cienegas at the Red Hill; the point of intake of this water is near the base of the mountains where the formations AA, C, and B come together. When water is discharged on the recent gravel, designated by the letter E, it begins at once to sink down, and where the recent gravel lies over the original metamorphic rock A, it sinks to that, and percolates down that, and enters the upturned strata of the old formation C, where it is received, and as soon as it descends to the point where the strata are filled it becomes a pressure supply of water; before that point is reached it is merely percolating through the old formation, the same as it would be in the new formation; and at the point where these waters are divided between the new and the old formation they are not under pressure, but are merely percolating waters, sinking by their own weight into the soil; and the reason for the old formation receiving this water is that the bending of the strata caused by the uplift of the mountain range and the secondary terrane of the Red Hills are upturned near the foothills so that the water can enter their ends, and when the point below is reached, where the upturned ends do not exist, no water can be received by the old formation from the upper formation.

Q have you some measurements taken of the San Antonio tunnel and at the division dam?

A Yes, sir; I have.

Q Will you give us those, please?

A I have some measurements taken, most of which Mr Trask has testified to, but there are a few which I did not take with him, and which I can give from my own notes.

On page 2558 of the reporter's transcript Mr Trask gives a table of the San Antonio Canyon and San Antonio tunnel supplies, and the October measurement for the year 1893 is left blank. This measurement was made by me and it was 132.5 inches.

Mr Britt, Q What date?

A October 2, 1893.

Q What is this - San Antonio Canyon or San Antonio tunnel?

A This was San Antonio tunnel.

Mr McKinley, Q What was the amount?

A 132.5 inches.

In 1894, I made the measurement given by Mr Trask in conjunction with him; and also on the 6th of August, 1894, I made a measurement at the divide dam with T. H. Sanders and J. T. Taylor, which gave for the total flow of San Antonio Creek, 309.2 inches, of which one half was the water of the San Antonio Water Company.

Mr Britt, Q It was a very dry year?

A '94 was a dry year; yes, sir; a year of light rainfall.

I also made a measurement at the same point the following day, August 7th, 1894; the total flow of San Antonio Creek was 291.2 inches; one half of which was the water of the

San Antonio Water Company; and on that day also measured the Gird water, which was 20 inches, and at that time I believe the San Antonio Water Company did not receive it; I think that was prior to their acquisition of it.

Mr Britt, Q. Was the Gird water a fixed amount of 20 inches?

A. It was supposed to be that originally, but in the recent suit it was cut down some, I think to about 15 inches, on account of non-user of the whole amount, and that is a prior right in the San Antonio Creek above the Divide Dam.

On the 14th of January, 1899, I measured the water coming from the San Antonio Tunnel, and found 48.06 inches; that was the total flow of the San Antonio tunnel.

On the 11th day of August, 1904, I measured the flow from the San Antonio Tunnel and found it 22.67 inches. I also measured the water at the Divide dam in San Antonio Canyon, the total flow at that point being 379.45 inches, of which 19 percent. salvage belonged to the Ontario Power Company, which deducted would leave 307.35, and deducting from this the Gird water, the balance would be divided equally between the San Antonio Water Company and the Pomona people for the Loop and Reserve Tract.

Mr Haskell, Q. What date was that?

A. August 11, 1904. These are all the measurements of the San Antonio Tunnel or San Antonio Creek at the Divide dam - - No, I think I have one more date in 1899 at the Divide dam; I will examine that; yes, on the 20th of October, 1899, I made a measurement at the Divide dam, and at that time, after deducting the Gird water, which was then going to the San Antonio Water Company, there remained 200 inches, to be

divided equally between the San Antonio Water Company and the Pomona people.

Mr Britt, Q How much in all? What was the total flow?

A 316 inches; the Gird flow was 20 inches; that was before the suit of which I spoke, and the full flow of 20 inches was taken on that day. Those are all my measurements of the San Antonio Creek and tunnel at the points mentioned.

Mr McKinley:

Q You have examined the record of rainfall , the tabulation as given in the record for 22nd Street, Ontario, have you Mr Finkle?

A Yes.

Q Have you arrived at any opinions concerning the conditions of the water supply in the Red Hills, as dependent upon that rainfall?

A I will answer first by saying that I have, and then explain.

Q Just proceed and explain what they are.

A The mean rainfall record, given on page 2457 of the reporter's transcript, which was kept by Mr Harwood at the corner of 22nd street and Euclid Avenue in Ontario, at an elevation of about 1700 feet, demonstrates that in this neighborhood the rainfall is heavier in proportion to its elevation than any other part of the San Bernardino Valley, between San Bernardino and the coast; that condition is one which applies to all of the country situated near the Pomona divide, and the precipitation at Pomona, and other points north, northwesterly and northeasterly, for several miles each way, is heavier than any other part of the valley, for similar elevations.

Q. Do you know the place where this record is kept?

A. I know the place personally.

Q. How far is it from the Red Hills?

A. It is about two and a half miles west of the Red Hill; the Red Hill section is in this belt of excessive rainfall which I referred to, and the entire region in that neighborhood, for a distance of five to eight miles each way, receives a very high rate of precipitation.

Q. Will you mark the place on the map and determine just how far it is on Defendants' Exhibit D?

A. At the point marked Section 30, on Defendants' Exhibit D, at the intersection of 22nd street and Euclid Avenue, Ontario, the center of section 30, is the point where that rainfall record was kept.

Q. Just mark that "Harwood" will you?

A. I have written the word "Harwood" there; in a direct line it is two and a quarter miles instead of two and a half as I estimated.

Mr Pritt, Q. Due west?

A. No, it is not due west; that is northwest from the Red Hill; due west the distance would be much less.

Mr McKinley, Q. What watershed is it in?

A. That is in the Cucamonga Water Shed; it is in the same watershed which is drained by the Cucamonga Canyon, and tributary to the Red Hills.

Q. Proceed and explain your views as to the rainfall, as to these waters in question.

A. The rainfall in that vicinity, like every other locality is dependent on elevation, and having a basic station from

which to figure, it is possible to obtain by calculation the rainfall at other elevations known, in the same neighborhood. For the purpose of doing this we apply a rule deduced by experiment from observations and first promulgated by the United States Geological Survey for this section of the Pacific Coast; this rule is founded on experiments, showing that the mean increase of rainfall from sea-level on the south and west slope of the mountain ranges in California, increases at the rate of .6 of an inch per hundred feet rise in elevation, up to a point 6000 feet above sea-level, and from that point up a similar decrease occurs, up to 9000 feet, which is the limit of the rainfall elevations covered by experiments up to this time; above 9000 feet we know nothing about it, so that it is impossible to figure from any known experiments the probable rainfall above that elevation.

This rule is applicable to all districts which have open areas lying between them and the Pacific Ocean; in other words, which have no intervening mountain ranges, the summits of which are higher than the gauge from which the calculation is made; to illustrate that point I will say that in this locality the Harwood gauge being situated at a point 1700 feet above sea-level, and there being no mountain ranges between that point and the coast higher than that, the rule is applicable; whereas, if there were any intervening mountain ranges higher than that, between that point and the coast, the application of the rule would become less reliable, and only approximate.

In order to determine the rainfall for a longer period than that covered by the Harwood record I have resorted to

the following method: The Harwood record, on page 2487 of the reporter's transcript, covers a period of 17 seasons, while the San Bernardino record on page 2493 of the transcript covers a period of 38 full seasons; the mean of the Harwood record for the seventeen seasons for which we have it is 20.61 inches, being from the year 1891-1892 to 1907-1908.

Q I notice the heading reads ~~from 1891~~ to 1901-1902; that must be an error.

A That should be to ~~1907-1908.~~ I think this was taken from an old printed card that probably had 1901-1902 on it; but the record is to 1907-1908.

During those same seventeen seasons, the mean rainfall at San Bernardino, from the record on page 2493 of the transcript is 14.54; while the mean of the whole 38 years at San Bernardino is 15.93 inches; the 38 years referred to being from the season of 1870-1871, to 1907-1908 inclusive. From this it appears that the 17 years corresponding with the Harwood record, are 9.6 percent below the actual average of 38 years at San Bernardino; and therefore in order to obtain the true average at the Harwood guage for 38 years, I have added nine and six-tenths percent to the 17 year average of 20.61 inches, which gives me 22.59 inches as the 38 year mean of rainfall at the Harwood station.

Mr Haskell, Q I don't understand that: you say that the mean average for San Bernardino for the Harwood period is 14.54?

A Yes, sir; for the same period covered by the Harwood guage yes, sir.

Q And then you say the average for the total San Bernardino

record is 15.93?

A Yes, sir.

Q What percent. do you use?

A I say that the difference between 14.54 nad 15.93, shows a deficiency of nine and six-tenths percent. for the 17 year period; the difference between the 17 year average and the real average is 1.39, which is nine and six-tenths percent of the 17 year average.

Q What do you call the real average?

A The 38 year average; and the 17 year average is 14.54; 1.39 is nine and six-tenths percent. of 14.54; if you add that much to it you will get the real average of 15.93; and I merely applied that same percentage to the 17 year record of the Harwood guage.

Now, taking the other elevations above that point, I have calculated the 38 year average rainfall for every 1000 feet, beginning with 2500 feet above sea-level, basing it on this 38 year record of 22.59 for the Harwood guage and obtained the following results:

For 2500 feet elevation, 27.39 inches, which applies from 2000 to 3000 feet.

3500 feet elevation, 33.39 inches, which applies from 3000 to 4000 feet.

4500 feet elevation, 39.39 inches, which applies from 4000 to 5000 feet.

5500 feet elevation, 45.39 inches, which applies from 5000 to 6000 feet.

6500 feet elevation, 79.39 inches, which applies from 6000 to 7000 feet.

7500 feet elevation, 33.39 inches, which applies from 7000 to 8000 feet above sea-lebel.

8500 feet elevation, 27.39 inches, which applies from 8000 to 9000 feet elevation, and is as high as the rule will permit you to go.

And these are the rainfalls which have been used for the average in making all computations of run-off from these watersheds; when the mean run-off has been determined similar calculations have been made as to all the watersheds under consideration.

Q Have you examined the tabulation on page 2513 of the reporter's transcript, with reference to the Frankish and Stamm tunnel?.

A I have.

Q What if anything do you find in that, bearing upon your opinions as to the waters in the Red Hill district?

A That tabulation shows thecorrectness of the theory, or of the geological determination made in that vicinity, that the material at the foot of the mountains is very coarse, being in the recent formation, overlying the ancient formation, and that it responds quickly to the rainfall and flood water from the adjacent watershed.

Q How does this table show that?

A By the fluctuations of flow from the tunnel, which show that during dry seasons, when there is no inflow into the formations above, or rather, very little inflow, the amount of water coming from the tunnel is greatly diminished; whereas in years of more abundant rainfall, the light flow is increased; it also shows the effect of the diversion for

irrigation in the summer months, from the mouth of the Cucamonga Canyon, that this tunnel flows water early in the season to a greater extent than later in the season, when the stream which supplies the gravels is diverted, and carried to Ioamosa; and further it shows that the amounts of water which have been taken from this tunnel have practically all been taken from the old alluviums which supply the artesian formation at the Red Hills, as this tunnel is situated close to the foothills, where the sinking water supplies not the recent gravel basin, but the ancient alluvial deposits, and no doubt the construction of this tunnel is one reason for the decline of the artesian waters in the springs and other sources in the vicinity of the Red Hills.

Q. Have you examined the table at page 2016 of the reporter's transcript, of the Bodenhamer well?

A. Yes, sir.

Q. State what that shows in regard to your opinion in reference to these waters?

A. The table of the Bodenhamer well at page 2016, which shows the fluctuations of water in the upper debris cone of the basin, demonstrates the effect of rainfall on the water in the recent gravels, showing that the well will rise and fall in sympathy, by an interval more or less rapid, from the occurrence of rainfall, which is an ordinary condition in all wells and formations which derive their supply from precipitation directly, and that they have an annual as well as a secular fluctuation in elevation; and this table is of a well in the vicinity of no develop-

ments, and demonstrates that the annual fluctuations of wells are in that locality to be ascribed to natural causes, and not to pumping interference, as the fluctuations of this well are more violent than any of the wells which have been used here to create the inference that pumping was affecting them.

Q What do you mean by secular? Secular fluctuations?

A I mean those due to cycles of wet and dry years.

Q Have you examined the tabulation at page 2551 of the reporter's transcript, covering the San Antonio Tunnel water?

A I have.

Q What if any opinions have you reached with regard to the waters in question, based upon those figures?

A It was the same as that of the Franklin and Stamm tunnel; as this tunnel is near the foothills and in the recent alluviums, or recent quaternary deposit overlying the more ancient, it draws its water from the former, and responds with regularity to the rainfall and consequent discharge of water upon the debris cone immediately below the mountain. And this tunnel is also an important factor in robbing the ancient alluvium of its supply, and has undoubtedly had its effect in decreasing the water supply at the Cucamonga Red Hills from cienegas and artesian sources, by its ~~extra~~ continuous diversion of water, which otherwise would have gone into the older formation, and a portion of it at least would have found its way to the Cucamonga Red Hills.

Q Have you examined the table at page 2555 of the reporter's

transcript, water output of the Cucamonga Red Hill district?

A I have.

Q Will you state your opinions that you have reached from that table and the figures given therein?

A First, in regard to that table, the year 1902 is left blank in this table, and I have supplied measurements there by taking Mr Stowell's testimony, and the testimony of Mr Dillman, and the testimony relating to the Sunset well for the year 1902, the exhibit 69 containing Mr Stowell's measurements, found on page 1152 of the reporter's transcript, plus 40 inches from the Upland Water Company's well, and 25 inches from the Sunset wells for that year, and I obtain the total water supply on the East side of the Red Hills as 277 inches for that year.

Mr Britt, Q How do you make up that 277 inches?

A 40 inches from the Upland Water Company's wells and 25 from the Sunset wells, and from Mr Stowell's measurements.

Q How much is that?

A Well, that would be the difference between the 277 and the 65; 212 inches.

Q What I would like to know is how you make up that 212 inches?

A In order to give you that, I would have to go to exhibit 69, in the testimony; I can do that on cross examination if you wish it; Mr Stowell accounted for 212 inches.

For that same yearon the west side I have obtained 306 inches, as the supply, that being partly taken from Exhibit 32, and partly from Stowell's measurements on June 3, and September 2 of that year, making 306 inches for the irriga-

tion season of that year, or a total supply in the entire Red Hill District of 583 inches that irrigation season of 1902.

In the year 1901, I have obtained a higher result than Mr Trask did for the east side; he gives 188 inches, and I obtain 263 inches, and my calculation is made up of Mr Stowell's measurements, on August 18, 1901, exhibit 69, and these amounting to 198.62, inches, to which I added the Sourwine or Upland Water Company's 40 inches, and the Sunset Water Company's 25 inches, making a total of 263.62, as the east side water for the season of 1901; and this would ofcourse change the total; otherwise I check Mr Trask's figures very closely, and I find that they are correct to within a small fraction in each case.

And the conclusion I draw from the tabulation is that the water on the east side has been diminished very little if anything in quantity, and that the method of drawing the water from the ancient quaternary formation which supplies it is very different from what it was in the days when cienegas were supplying a natural flow, as the construction, first, of the Y tunnel and cuts began to make that change, and it has continued gradually from the time of their con-construction up to the present time, when the water is being drawn by the numerous wells of the Cucamonga Water Company, and its tunnels, as well as the wells of the Upland Water Company and Sunset Water Company, and the Old Settlers, and others who are draining their supply of irrigation water from the same formation and from the same channels leading to the Cucamonga Springs and the Y tunnel; so that if these

figures are analyzed, it is really a surprising state of affairs from the fact that there is so much water in evidence on the east side, and this in spite of the fact that the seasonal rainfall was very light for a ten-year period beginning in 1894; and that the supply is not being overdrawn is demonstrated by the rising water-plane in that neighborhood, as since the better rainfall returned the water has every yearbeen rising, showing that they are not drawing the full supply contributing to the east side; and I attribut this in a great measure to the operations of the San Antonio Water Company in spreading this flood water near the mountains, which is helping the ancient alluvium both on the east and west side, and making the supply much larger than it would have been, if this work had not been done, during the last three or four years.

Q You speak of the rainfall in consideration of this table: Do you draw any connection as to the connection of the rainfall with the amount of water produced in that section?

A I find that during the dry seasons, the water supply was undoubtedly overdrawn temporarily on the east side, as the rainfall did not supply sufficient water to keepit up, and the people who were relying on natural sources, and others who were not relying on natural sources, would sink wells and make developments, which they used, and overdrew the supply, causing the water-plane to fall rapidly; but with the advent of better rainfall, in spite of these drafts, the water-plane has been rising, so that on the average it is not being overdrawn, but is well within the average of the supply.

Q What effect did the rainfall have on the surface and

Q What effect did the rainfall have on the surface and gravity waters on the east side?

A As far as the surface waters running at the Cucamonga Springs is concerned, every winter of heavy rainfall there is more or less surface water which travels down and mingles with the Cucamonga Springs, but this is water which runs to waste as it is not used in the winter season during those years, and the work of the San Antonio Water Company in spreading waters above Base Line, and particularly near the Canyon, has stored these waters which were wasted in the winter, and that is what is now making the rapid rise of the waterplane a fact, and with the close of the present cycle of better seasons, this waterplane will undoubtedly be as high as it ever was, in spite of the drafts made upon it.

Q What effect will the lowering of the water-plane have on the waters coming out at the surface at certain points?

A It would prevent the escape of the water at the very high levels, and it conserved a certain amount of evaporation which was formerly lost in those cienegas, and in that way aided the larger drafts which had been made, so that they were made possible; the lowering of the waterplane by the 25-acre tract wells and tunnel, and the Lone Star tunnel, particularly, together with its wells, as well as the dry seasons, prevented the escape of as much water at the Cucamonga Springs as formerly existed, and that condition was temporary and is now recovering, and probably will recover, in spite of the drafts of the other pumping plants in that same formation near it.

Q You are partially covering the question I asked you: What is your opinion as to whether the waters had disappeared from those lands , or gone down so that they did not come out by gravity?

A The waters had not disappeared; it was a temporary lowering of the waterplane attributable to the causes which I have mentioned, namely, the dry seasons, the developments of others to the east, in the same channels from which these springs were supplied, and the general lowering of that waterplane was the result of that, but the water did not disappear from the lands and remained at a little lower level in abundant quantity for use.

One other factor which I desire to mention as having contributed to the recent recovery is the work of the Cucamonga Water Company in the Lone Star tunnel, by running flood water into that tunnel, and having bulkheaded the tunnel, on the 55 acre tract; I believe that work is in the right line of conservation of water, and will materially aid in increasing the supply, and maintaining it, and bringing the water level back to its former position.

Q Have you examined the tabulation of water elevations in the Lady tunnel, beginning on page 2091 of the reporter's transcript?

A I have.

Q What opinion have you reached, based upon that, taken in connection with the other matters which you have testified to?

A This tabulation based upon measurements of the water-level in well number 9, which is the plaintiffs' well number

14, of water levels of well number 3 of the 16th street wells, as well as discharge of the Eady tunnel on contemporaneous days, shows that well number 9, which since the construction of the bulkhead was an index to the water level in the formation at the Eady tunnel, does not act in sympathy with well number 3 of the 16th street wells, and that the theory of the plaintiffs' experts that well number 3 and the Eady tunnel are in the same formation and in sympathy is disproved by this tabulation, as the fall of well number 9 does not cause the fall of well number 3, when the bulkhead is manipulated; on the contrary well number 3 continues to rise, and this ofcourse could not be demonstrated before the construction of the bulkhead, but since the construction of the bulkhead the demonstration has been made absolutely complete, as to the lack of any relation between these two wells, or between the watersupply in the Eady tunnel and well number 3 on 16th street.

Q Will you point out how these figures demonstrate that?

A Do you mean with a diagram?

Q No, just by the figures ?

A For example, you take in this tabulation on page 2591 of the reporter's transcript, take the measurement of levels in well number 9, on March 30, 1908; the elevation was 1362.5; on the same date in well number 3 it was 1362.9; and the next measurement of April 13, 1908, the water in the well number 9 had fallen to 1346.7 feet, a decline of 5.8 feet; while during the same time the waterlevel in well number 3 had risen to 1363.6, an increase of .7 of a foot, the two wells working in the contrary direction.

The same thing is illustrated by the measurement of April 27, 1908, when well number 9 was 1352.4, and well number 3 1384 feet; May 11, 1908, the water had fallen in well number 9, by reason of opening the bulkhead, to 1345.7 feet, which is a drop of 6.7 feet; while during the same time it had raised .1 (one-tenth) of a foot in well number 3. On the theory that these water supplies are in contact , the drop should also have occurred in well number 3, in sympathy with the drop in the Eady tunnel, or in sympathy with the drop in well number 9, and the increase of discharge of the Eady tunnel.

And in the next measurement of June 8, 1908 the water dropped .4 of a foot in well number 9, while it raised .5 of a foot in well number 3 between those dates; and the intervening pumping on the 16th street well after that, made it impossible to continue these measurements any further, but they all show a lack of relation or sympathy between these two water supplies, demonstrating that the Eady tunnel draws its supply from the old formation, and the 16th street wells from the new formation, which two are not related, and their water supplies are not intermingled to such an extent as to make one dependent upon the other or affect the other.

Q Have you calculated the areas of the watersheds at the different elevations, as far as these waters are concerned, Mr Finkle?

A I have.

Q Give those areas?

A Which canyon do you wish first?

Q. It doesn't matter; you may give Cucamonga Canyon first.

A. Taking the areas of Cucamonga Canyon watershed above Base Line, I obtain the following figures:

Below 2000 feet elevation, 6.65 square miles.

Between 2000 and 3000 feet, 3.44 square miles.

Between 3000 and 4000 feet, 2.64 square miles.

Between 4000 and 5000 feet, 2.3 square miles.

Between 5000 and 6000 feet, 2 square miles.

Between 6000 and 7000 feet, 1.5 square miles.

Between 7000 and 8000 feet, 1.31 square miles.

Between 8000 and 9000 feet, .36 square miles.

making a total of 22.3 square miles north of Base line; these elevations are all calculated above sea-level, according to the bench marks of the United States Geological Survey.

The mountain watershed of the same canyon, as aggregated from the valley portion, and arranged so as to correspond with the variations of rainfall is as follows:

Between 2500 and 3000 feet, plus that between 8000 and 9000 feet, 1.42 square miles.

Between 3000 and 4000 feet, plus that between 7000 and 8000 feet, 2.95 square miles.

Between 4000 and 5000 feet, plus that between 6000 and 7000 feet, 3.90 square miles.

Between 5000 and 6000 feet, 2 square miles,

Or a total mountain watershed of 11.17 square miles. That is the mountain water shed above 2500 feet in elevation of the Cucamonga Canyon.

The next Canyon to the east is Deer Canyon for which I

have calculated the following areas:

Below 2000 feet, 9.01 square miles.

From 2000 to 3000 feet, 4.9 square miles.

From 3000 to 4000 feet, 2.6 square miles.

From 4000 to 5000 feet, 1.64 square miles.

From 5000 to 6000 feet, 1.33 square miles.

From 6000 to 7000 feet, .55 square miles.

From 7000 to 8000 feet, .25 square miles.

From 8000 to 9000 feet, . 12 Square miles.

Total for Deer Canyon watershed above base line, 20.4 square miles.

Q. Did you give the mountain watershed, as you did with the other?

A. No, I have not segregated the watershed in that way for any of the others except Cucamonga Canyon; they are segregated by elevations, which practically makes that segregation, as you cansee by these elevations; in this case practically everything above 2000 feet is mountain water shed.

The next is Day Canyon, which has the following areas:

Above Base Line and below 2000 feet, 5.04 square miles.

From 2000 to 3000feet, 2.00 square miles.

From 3000 to 4000feet, 1.11 Square miles.

From 4000 to 5000 feet,1.25 square miles.

From 5000 to 6000 feet,1.26 square miles.

From 6000 to 7000 feet, .75 square miles.

From 7000 to 8000 feet, .28 Square miles.

From 8000 to 9000 feet, .11 square miles.

Giving a total of 11.80 square miles.

Then taking San Antonio Creek, which is the most westerly of the watersheds contributing to the Red Bills, we have the following:.

Below 2000 feet, 6.16 square miles.

Q That is between 2000 feet and the Base Line?

A Yes, sir; this is all north of the Base Line.

Q Mr Britt: This does not include any of the watershed below the Base Line?

A No, sir; it does not include anything below the Base Line, because it could not by any possibility cut any figure upon the total contributing watershed; the watershed below Base Line did not contribute to the Red Bill formation.

The watershed of San Antonio Creek is as follows:

Below 2000 feet and above Base Line,	6.16	square miles.
Between 2000 feet and 3000 feet,	5.14	" "
Between 3000 feet and 4000 feet,	4.32	" "
Between 4000 feet and 5000 feet,	5.15	" "
Between 5000 feet and 6000 feet,	4.07	" "
Between 6000 feet and 7000 feet,	3.91	" "
Between 7000 and 8000 feet,	4.65	" "
Between 8000 and 9000 feet ,	2.20	" "
Between 9000 and 10,000 feet,	.30	" "
Making a total of	36.1	square miles

in the San Antonio Creek watershed ~~supply~~ north of Base Line.

Q How do you determine the run-off from that region?

A The method I have the greatest faith in is to take the experiments of the Arrowhead Reservoir and Power Company,

which cover the runoff from the watersheds of that company since the year 1881 up to date; during all this period the Arrowhead Company has kept a record of rainfall and runoff on all of its various watersheds, on the San Bernardino mountains, and from that has been constructed a runoff curve, by which the runoff per square mile is the abscissa and the rainfall in inches is the ordinate, and any part of this curve can be segregated for a corresponding rainfall, and the runoff calculated in that manner; the reason I have the most faith in that method is that it is an experimental test of watersheds in southern California, similar to all of the other portions of the Sierra Madre mountains, and San Bernardino mountains, and therefore expresses more correctly the ratio of rainfall to runoff, than any other curve invented.

However, there is another method which is often used, and that is that is known as the Newell curve, which is a curve proposed by Mr F. H. Newell, who is now the head of the reclamation service, former director of the United States Geological survey; this Newell curve also gives the relation of runoff to rainfall on mountainous areas, and undulating areas, which are of mixed mountains and valleys, and by applying the Newell curve, you also obtain approximately the amount of runoff from these watersheds, although I do not believe as closely as you do with the Arrowhead curve.

Q. Explain just what is meant by runoff?

A. By that is meant that portion of the rainfall which will be discharged either as underground or surface flow, as distinguished from that portion of the water which is evaporated or consumed by plant life, or lost in other ways,

and does not form any part of running streams either above or at sea-level; ofcourse all percolating waters must come to the surface above sea-level, unless they are discharged into the ocean.

Q. You say underground streams: Does that include percolating waters?

A. Including percolating waters, which are supplied and created at a depth, where they will not be withdrawn by evaporation.

Q. What do you mean by flood runoff?

A. By flood runoff we mean that runoff which occurs during the course of a rainy season, and which passes down into the drainage channels, and flows out of the watershed under consideration, and when we speak of this watershed, at Base Line, we mean by flood runoff, that which would pass down and cross over Base Line.

Q. What do you mean by mean runoff?

A. By the mean runoff is meant the average for a period of years of which we have rainfall records; if we have no rainfall records or runoff records, it would be impossible to calculate one from the other, but having one you can calculate the other, and in this case by mean runoff from the different watersheds, we mean a 38 year mean, based on the San Bernardino rainfall which covers that length of time.

Q. That rainfall record do you say you take for it?

A. For the mean I take the San Bernardino rainfall for 38 years, as I have explained, from which I have interpolated an extension to the Harwood rainfall record, as applicable to this immediate area, but the whole thing is based

on the San Bernardino mean, making due allowance for the greater rainfall at the vicinity under discussion, as shown by the Harwood guage.

Q You have used the Harwood rainfall really as the final measure of the rainfall, but taken the San Bernardino Rainfall as a basis from which to figure, so as to cover a longer period?

A Yes, sir; that expresses it; I have used the Harwood rainfall as far as it would go, and then I have used the San Bernardino rainfall for the purpose of determining what addition or subtraction would be made, from the Harwood 17 year mean, in order to compare it with the 38 year period.

Q Will you give me the mean runoff of the Cucamonga Canyon and the other canyons in succession.

A I will read them to the reporter and he can take them down in tabular form, and they will be much better for reference.

The Cucamonga Canyon water shed runoff is as follows:

RUN-OFF CUCAMONGA CANYON WATER SHED.

Elev. Above Sea-level, Feet.	Rainfall in Inches.	Area in Sq. Miles.	Run-off per Square Mile, in Second Feet.	Run-off per area in Second Feet.
Below 2000	22.6	8.65	0.40	3.46
2000 to 3000 8000 to 9000	27.4	3.60	0.62	2.35
~~8000 x to x 9000~~ 3000 to 4000 7000 to 8000	33.4	3.95	0.97	3.83
4000 to 5000 6000 to 7000	39.4	3.90	1.31	5.11
5000 to 6000	45.4	2.00	1.72 ~~1.72~~	3.44
			Total	18.19

This tabulation just given is by the Arrowhead Reservoir Company's experiment, and gives a total run-off of 18.19 second feet, or 909.5 inches.

This is based on the mean of 38 years; that is for the Cucamonga Canyon watershed.

Q. Is this the result of applying the Newell curve or the Arrowhead curve?

A. I just stated this was by the Arrowhead curve, this one; I will give the others later; this is the Arrowhead curve at present.

Q. Now, the next water shed?

A. This is the calculation of runoff from the Deer Canyon watershed, based on a 38 year mean, and calculated by the Arrowhead curve; the runoff from the Deer Canyon water shed is as follows:

RUN-OFF DEER CANYON WATER SHED.

Elev. Above Sea-level, Feet	Rainfall in Inches.	Area in Sq. Miles.	Run-off per Square Mile, in Second Feet.	Run-off per Area in Second Feet.
Below 2000	22.6	9.01	0.40	3.60
2000 to 3000 8000 to 9000	27.4 ~~22.6~~	5.02	0.62	3.11
3000 to 4000 7000 to 8000	33.4	2.85	0.97	2.76
4000 to 5000 6000 to 7000	39.4	2.19	1.31	2.87
5000 to 6000	45.4	1.33	1.72	2.29
			Total	14.63

Giving a total of 7[illegible]1.5 inches, as the mean runoff from the Deer Canyon watershed, for the [illegible] year period, by the Arrowhead curve.

Q. Mr Pritt: That means annual inches in perpetual ~~xxx~~ flow?

A. Yes, sir.

The next is Day Canyon above base line, by the Arrowhead curve for the [illegible] year mean, is as follows:

RUN-OFF DAY CANYON WATER SHED.

Elev. Above Sea-level, Feet.	Rainfall in Inches.	Area in Sq.Miles.	Run-off per Square Mile, in Second Feet.	Run-off per Area, in Second Feet.
Below 2000	22.6	5.04	0.40	2.02
2000 to 3000 8000 to 9000	27.4	2.11	0.62	1.31
3000 to 4000 7000 to 8000	33.4	1.39	0.97	1.35
4000 to 5000 6000 to 7000	39.4	2.00	1.31	2.62
5000 to 6000	45.4	1.26	1.72	2.17
			Total	9.47

This gives 472.3 inches annual flow, as the runoff from Day Canyon, for the mean 30 year period, by the Arrowhead curve.

The next is San Antonio Canyon watershed by the same curve, and for the same period:

RUN-OFF SAN ANTONIO CANYON WATER SHED.

Elev. Above Sea-level, Feet.	Rainfall in Inches.	Area in Sq. Miles.	Run-off per Square Mile, in Second Feet.	Run-off per Area, in Second Feet.
Below 2000 & above 9000	22.6	6.46	0.40	2.58
2000 to 3000, 8000 to 9000	27.4	7.34	0.62	4.55
3000 to 4000, 7000 to 8000	33.4	8.97	0.97	8.70
4000 to 5000, 6000 to 7000	39.4	9.26	1.31	12.13
5000 to 6000	45.4	4.07	1.72	7.00
			Total	34.96
			Total	34.96

Reducing the second feet to inches, gives a continuous flow of 1748 inches from the San Antonio watershed, calculated by the Arrowhead curve, for 38 years; this completes the mean of all the watersheds by the Arrowhead curve. Do you wish the Newell curve results?

Yes, just give the total results; you need not give the tabulations.

By the Newell curve for undulating areas, which probably gives a result lower than that which actually takes place, while the Newell curve for mountainous areas would give a result too high; I have taken the Newell curve for undulating areas, which would be mixed mountains and valleys; as a 38 year mean in the Cucamonga watershed I obtain 723 inches, perpetual flow, as the total runoff of the Cucamonga watershed above Base Line; if we take the mountain portion of Cucamonga canyon watershed alone, by the Newell curve, taking that portion which lies higher than 2500 feet above sea-level, we obtain 548 inches, by the Newell curve, and deducting from that one-third, or 183 inches as storm runoff, we would have 365 inches at the mouth of the Cucamonga Canyon, by the Newell curve.

Deer Canyon, by the Newell curve, for undulating areas, would give a total runoff for all portions above Base Line of 572 inches, continuous annual flow, for the 38 year mean, as before stated.

Day Canyon, by the Newell curve, for undulating areas, gives a mean annual flow of 377 inches for the total watershed north of Base Line, based on a 38 year period.

And for the San Antonio watershed also above Base Line,

the Lewell curve for undulating areas, gives a total mean annual runoff of 1423.5 inches, for the 38 year period.

In each case the amount obtained by the Lewell curve is less than that obtained by the Arrowhead curve; I am of the opinion that the former is nearer the correct figures.

Q Can you give the mean runoff from the Cucamonga Canyon, from the year 1904-1905 to 1907-1908, inclusive.

A By the Arrowhead curve or record this would be a mean for four years, of 1210 annual inches, and by the Lewell curve for undulating areas, the mean for the same period would be 1006 inches.

Q Now, will you give the Cucamonga Canyon runoff for the season of 1906-1907?

A I have that: taking the season of 1906-1907, on the Cucamonga Canyon watershed north of Base Line, the Arrowhead record gives a mean runoff for that year of 1440 inches, and the Lewell curve for that year gives 1175.5 inches.

Q Will you give the runoff for the Cucamonga Canyon watershed above Base Line, for the season of 1907-1908?

A For the season of 1907-1908, and by the Arrowhead curve, the runoff would be 668 inches, continuous flow, that year. I don't know whether I figured that on the Lewell curve.

Here the Court takes a recess until Monday, April 5, 1909, at 10:30 o'clock a.m.

-o-

J.M. McKinley.

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co.,

Plaintiff

vs.

San Antonio Water Co.,

Defendant

Vol. 45.

Monday, April 5, 1909.

I. BENJAMIN, Official Reporter

Monday, April 5, 1909. Forty-fifth Day.

F. C. FIELD.

Direct Examination, Resumed.)

Mr. McKinley: Q You have some corrections, I believe.

A I have gone over the testimony in volumes 41, 42 and 43 which I gave, and I find some clerical errors.

On page 3829, line 29, the word "LeComte" should be "LeConte".

On Page 3830, the first word on the page should be "Salisbury" instead of "Saulsbury".

Page 3842, line 15, instead of 103.73 it should be 103.37 inches.

On page 3843, lines 4 and 5, in line 4, the figures 109.5 should read 48.6 and in line 5 after the word "water" the words "going to the Cucamonga Water Company" should be added.

Page 3846, line 22, the word "of" before "water" should be changed to "to".

Page 3848, line 27, the figures should be 17.96 instead of 17.86.

Page 3849 line 15, the last word "the" should be omitted.

Page 3864 line 6 the figures 31.1 should be 37.8. And in line 7 after the word "dam" the words "making 39.8 inches" should be added.

On page 3860 I wish to ask you, Judge Britt, if you did not leave out the word "no" between "of" and "relation" in line 15. I know reading from that diagram the word "no" occurs and I understood you to have the word "no" in there

Mr. McKinley: That was an objection; not a question.

Page 3863, line 27, the word "Tirth" should be "fifth"

Page 3864, line 12, the first word should be "and" instead of

"from".

Page 3865 line 20 the date given should be November 22, 1908, instead of 1909.

Page 3867, line 2, after the ~~xxxx xxxx~~ second word in the line the word "at" should be inserted, reading "hydraulic head at the outlet of Cucamonga Springs."

On page3868, line 25, September 29, 1905, should be September 19, 1905.

Page 3873, line 21, the last word in the line should be "there" instead of "this".

Page 3874, in lines 16 and 23 the expression "2GH" should in each case be under the radical sign.

It may be that my copy is indistinct and it may be all right in the original.

Page 3876, line 21, ~~after~~ before the word "IN" the word "without" ~~xx~~ should be inserted.

Line 22, the word "vacuum" should be "vacuo".

Page 3878, line 5, the number 175 should be changed to 165.

Page 3881, line 2, the word "affecting" should be changed to "affect".

Page 3884, line 14, after the figures 33.4 the word "feet" should be inserted.

Page 3885 line 1, the number 7.43 should read 7.41.

Page 3889, line 18, the last word "of" should be changed to "above", and in line 23, the word "was" should be changed to "were".

On page 3898, line 2, insert the word "and" after the word "tunnel".

On page 3905, line 18, the date 1986 should be 1896.

Page 3907, line 22, insert the word "and" after the word "tract".

Page 3908, line 27, strike out the word "as" after the word "and".

3914, line 4, strike out the first character in the line before "strata" (a)

3919, line 22, insert after the word "spaces" the word "through" and strike out the word "in" in line 23, to make it read as follows: and when that bend took place at the Red Hill it undoubtedly opened spaces through which the enormous pressure of water would cause springs to appear."

Q In testifying in regard to Defendant's Exhibit 21, you stated you had made other calculations determining the coefficient by means of the discharge and elevation on other dates? You made a couple of such calculations?

A I made two such calculations.

Q During the noon recess will you put on lines showing those also on that diagram?

A I will.

Q In testifying in regard to the Eadie tunnel and the formations, you made a statement with regard to the contact between the ancient formation and the recent: and the burrow holes shown there: Will you describe how those formations lay?

A The ancient formation was dipping to the north, and consisted of a compact clay and sandy silt, and in the surface of the ancient formation were these burrow holes and roots of trees and brush, and over that was the recent gray deposit of gravel and sand, which was lying nonconformably to the

dip of the old formation, and the indications were plain that the recent had been lain on the old, after the uplift of the Red Hills.

Q Have you examined the table on page 2562, and checked the figures? Just state what examination you made, and what you find in regard to it?

A I have examined that table, and I check Mr Trask's figures, except for the year 1902; there is a slight variation for that year.

Mr Britt: What is this table? I have not the page before me

Mr McKinley: Tabulation showing the amount of water received by San Antonio Water Company from Lady tunnel, expressed in annual inches.

A For the year 1902 I make the figure 203.55 inches, instead of 192.6, as Mr Trask gave, and I ~~farm~~ obtained that by taking the ~~mass~~ average of the measurements given, on Exhibit 69, up to May that year, and ~~for~~ after that year I take the other measurement given by Mr Stowell on Exhibit 69 in September, and add to it the 65 inches - -

Q Do you mean after that year or after that month?

A After that month, for the last half of the year, I take Mr Stowell's measurements on Exhibit 69, for September 2nd, and add to it the 65 inches rented to Chaffey by the Ontario Power Company, and ~~making~~ taking that as the mean flow after the Ontario Power Company was acquired by the San Antonio Water Company, I averaged that with the other measurements, which gives me 203.55 inches, as the amount of water taken from the Lady tunnel in 1902, by the two companies, the San Antonio Water Company, and the Ontario Power Company.

In other respects I check Mr Trask's calculations on that table.

Q Did you make a measurement of the weir at well 3, on the 18th of March, 1899, when you said you were there?

A I did.

Q What was that measurement,- that is, what did you measure?

A I measured the water flowing over the weir, and also the height from the lip of the weir to the discoloration or water mark in the box.

Q Well, you gave the measurement of the water flowing; Now, what did you find as to the other measurement?

A I found that the mark or discoloration on the box, was two-tenths of a foot above the lip of the weir, which would give a discharge of 28.92 (twenty-eight and ninety-two hundredths) inches, if the water were up to that mark and the weir open.

Q What intermingling of water, if any, in the two formations is there, in your opinion, in the Radie tunnel?

A The Radie water obtains its waters from percolations entirely from the recent formation; after breaking through the ancient formation, about station 20 on the tunnel, up to which point no water was developed, there has been a small amount of water developed, from percolating water in the gravel basin of the recent formation; all of the remaining water in the Radie tunnel is from artesian wells in the red formation.

Mr Britt, Q I understand that to be above station 20?

A Yes, sir; north of station 20 in the tunnel.

Q Wherever that is; I suppose that will be explained.

A It is shown on exhibit Z3, at the point marked 2000 on the Eadie tunnel; that is where station 20 is.

Mr McKinley, Q Have you made calculations of the replenishment of the water supply from spreading the Cucamonga Canyon flood waters by the San Antonio Water Company?

A I have.

Q Will you give them?

A Beginning with the year 1904 and 1905, the season of 1904-1905, the total amount of flood water which I figure the San Antonio Water Company spread out from the Cucamonga Canyon, was a mean flow of 160 inches, distributed over one year.

Mr Britt, Q That is from the Cucamonga Canyon?

A From the Cucamonga Canyon; yes, sir.

For the following season, 1905-1906, the average was 300 annual inches.

For the season of 1906-1907, the average was 560 annual inches.

And for the season of 1907-1908, the average was 144 annual inches.

And for the four years, the mean amount of the flood water which the San Antonio Water Company has conserved is 291 annual inches, extending over the four years.

Mr McKinley, Q How do you make the calculations? I don't mean by giving the detailed figures, but explain generally, how those calculations are made?

A By taking the table given by Mr Trask in his testimony on pages 2505 and 2507 of the reporter's transcript, giving

measurements of water made by him at the mouth of Cucamonga Canyon, and considering the rainfall data of the various years in connection with these measurements, and deducting from the totalx water which we obtain as escaping from Cucamonga Canyon, 20 percent. as water which would naturally sink any way, the remainder which the stream supplied, has been credited to the replenishment by the San Antonio Water Company. In this calculation none of the large floods are considered, because Mr Trask's measurements do not cover any large floods; they merely cover the ordinary storm runoff sometime after a flood has occurred; so that the calculation gives results which are probably below the actual facts; how much it is impossible to state; but by making the calculation based on the available data we have, the figures which I have given have been obtained.

Q Explain how these waters replenish the supply?

A If these waters were not spreadout over the gravel basin the result would be to silt over the bed, and the waters would pass down, excepting the probable amount of 20 percent lost by seepage, and would flow down below the red hills into the lower valley; but by taking the waters out of their channel and shifting them on new ground, which is not covered with silt, the loss will be complete, and the waters so spread will enter the gravels, and in that way will sink down to the lower plane of saturation. The water sinking near the foothills will replenish both formations, both the ancient and the recent, as at that point the ancient formations are tilted up, in conformity with the uplift of the main mountain range, and water sinking over where these

strata are tilted up, so that water can enter them, will find its way into the ancient formation, and supply the artesian sources below.

Mr Britt: When this witness speaks about tilted strata and so on, I would like to know whether it is a part of his observations, or whether it is all part of the opinion which the witness is venturing here.

Mr Mchinley: Well, it is opinion evidence, based on observations I suppose; Explain what it is:

A It is based upon observation in this way: that by finding the uplift of the Red Hills, having an axis somewhat approximately parallel to the main mountain range, and then the uplift of the main mountain range itself, reasoning from these two causes, the conclusion reached is that there is a curve or depressed basin, as shown on Defendants' Exhibit 23. Now, as other data which corroborate the same thing, are the boring of the 16th street wells, which penetrated into the recent alluvium all the way down, and did not penetrate down into the Red Hill formation.

Mr Britt: I ask that the statement of the witness concerning the strata penetrated by the boring of the 16th street wells be stricken out as not responsive to any question; and also because there is no evidence in the case upon which to found any such statement of opinion; there is no log of any of the 16th street wells in evidence, nor any witness who testified what the strata penetrated by the 16th street wells consisted of; it has appeared that the San Antonio Water Company has what purport to be such logs, but it never has produced them in evidence.

Mr McKinley: It has not appeared that we have the logs but a copy - - -

The Court: Are not those logs in evidence?

Mr McKinley: No, sir; they are not in evidence.

The Court: Ofcourse if they are not in evidence that should go out; it seems to be responsive to your question, Judge Britt, but the statement will go out for that reason, that the logs are not in evidence.

A Shall I proceed with the remainder of the explanation?

Mr McKinley: Just as counsel desire; if he wants any more explanation you can go on and give it; if not we will go on with the main proposition; I will leave it to him.

Mr Britt: I only asked whether he was stating observations or whether he was stating theories; he has answered that he is stating theories on that.

A I did not state that I was stating theories; I have a numberof other facts on which this is based if you wish them.

The Court: Can't you make one statement, whether it is on facts or on theory?

A Well, it is on fact; the theory is based on facts, whatever theory there is in it, and on a number of facts.

Mr McKinley: Unless counsel wants to inquire further, you need not go on, but you may answer the original question, your explanation of how these flood waters replenish the water supply.

A I was interrupted before I reached the rest of the facts in the case. I understand you do not wish any more of them (to Judge Britt) If not I will go on.

Mr Britt: I am not examining the witness at present.

Mr McKinley: Proceed with your explanation as to how the watersupply is replenished by the diverted flood waters?

A I was speaking of the fact that the waters sinking near the foothills would enter the two formations, part of them entering the uplifted or upturned strata of the older formation, and those which did not penetrate to that depth, would follow down and saturate the recent formation under the basin; and those waters which sink at a distance from the foothills replenish the basin entirely without affecting the older formation, as the older formation is not open at points lower down in the basin, as it is at the upper part where the strata are uplifted; and the replenishment by the water spread takes place to the full extent, except that may be lost by evaporation and plant life from the surface where the water is spread out.

Q Have you made calculations as to replenishment of the waters from the San Antonio Canyon; if so give them.

A In the case of the San Antonio Canyon, I have only made calculations covering four seasons, being the same ones which are included in my reply as to the replenishment of the Cucamonga Canyon.

Q In connection with that will you explain the way in which they replenish. and proceed with your answer, as I will have to be excused from the court room for a moment to answer the telephone; but proceed with your answer.

A As the facts on which to base this estimate, so far as the time of spreading these flood waters are concerned, are not in evidence, in order to reach a conclusion as to the time each year, I consulted the records of rainfall,

and my knowledge of the length of the irrigation season, for these past four seasons, and fixed the time as 110 days for the season of 1904-1905; 120 days for the season of 1905-1906; 170 days for the season of 1906-1907; and 60 days for the season of 1907-1908. Then if we assume that the testimony gives from 150 to 300 inches, as discharge during this time, and take a mean of that or 200 inches, we would get a mean of 63 inches for the entire four years, 63 inches continuous flow, as the actual amount of water applied; from what I have observed at the visit made on the 15th of March, 1909, as well as the water consumed by the power plant, at the head of the Ontario Colony, and the amount of water which I saw flowing in the 19th street ditch, at one other date when I was there, I conclude that is probably about one-half of the amount put on the gravels from San Antonio Canyon.

Mr Stevens: It seems to me that the statements that the witness has just given are wholly improper to go into the record; they are assumptions of fact; he says from the amount of water he saw flowing there at a certain date, and the amount he saw flowing at some other date, he assumes that certain other things are true in regard to the amount of water which flowed the entire time.

The Court: I do not understand this witness is testifying solely as an expert.

Mr Stevens: Has he any right to assume the existence of facts, predicated upon any such statement as that?

Mr Joliffe: He says he saw the water at one time, and saw it at another time, and he takes his own measurement.

Mr Britt: Yes, the time on the 15th of March, when the defendants had obviously fixed up the flow for the inspection of the Court.

Mr Jolliffe: We say there is nothing to warrant that statement, and we say that it is not true.

Mr Britt: Yes, it is true, for there was about 500 or 600 inches of water flowing there at that time, and the evidence was that on no other occasion, had there been more than 300 inches of water flowing there.

Mr Surr: Because it was not observed or measured.

Mr Joliffe: There is evidence of a measurement of 400 inches at one time.

Mr Britt: The evidence is that between 100 and 300 inches of water flowed there.

(Mr McKinley here returns to court room, and previous record read by reporter)

Mr McKinley: I understand now there is a motion to strike out that testimony?

The Court: Do you move to strike that out?

Mr Stevens: Yes, I now make a motion to strike out that testimony, that from the observations he made, that so much water had gone into the gravel.

The Court: That will have to be granted unless connected up; he says he bases his conclusion upon two measurements or observations; one measurement is in evidence, and the other one is not; I think we have a right to know what that other observation was and have it in record. We are entitled to have the data upon which he bases his opinion.

Mr McKinley: No objection to its being stricken out.

Mr McKinley, Q What are your calculations based on? What are they based on- your own observations or the evidence here?

A Based on both my own observations and the evidence in the case.

Q Do you mean there are two calculations?

A Two calculations, and both based on facts which I know, and on facts in evidence in this case.

Q What have you observed yourself, with reference to the conditions there as to replenishment?

A The only two occasions on which I have observed it was the occasion when I was there on the 15th of March, 1909, with the attorneys and the Judge of this Court; and on another occasion when I was there with Mr Trask; on the previous occasion, which was some two or three years ago, Mr Trask and I came through that way, from the Red Hills, and saw the water flowing in this 19th street ditch, to an amount which would be somewhere near 500 inches, about the same as when we were there on the 15th of March; we did not then have time to measure the water, as we were to catch a train, and had no current meter with us to make a very accurate measurement with.

But I also base it on the further fact that I know the power plant located at the head of the colony-- I know that plant for fifteen years or over, and I have been there on professional business several times, and I know that they usually consume ~~that~~ 400 inches of water or more, and that that water flows down Euclid Avenue and flows into the 19th street waste ditch. And the second calculation which I was about to give is based upon these two observations which I made myself and upon the knowledge I have of the amount of water used by that power plant.

The Court: Q The measurement of the 15th of March of the 19th Street ditch is in already, is it?

A That is in evidence.

Mr. McKinley: Q State in what way you took those into consideration in your calculation.

A In this way: Having been there on two occasions when there was over 400 inches flowing in the 19th Street ditch, and knowing that that ditch is the outlet from the power plant in the winter when the water is not used for irrigation, and knowing the amount of water required to operate that power plant, in putting those things together I feel from my own knowledge able to state that the probable amount of water which has gone into this is ~~the~~ a mean of about 400 inches at least, during the non-irrigating season the last four years, when I am making this calculation for the purpose of determining the amount of water stored.

Q Please give your calculation.

A Taking 400 inches, based upon these statements--

Mr. Waters: May it please the Court, I ask to make this crit-

icism at this time and, if necessary, to ask a question or two as to this estimated data of the amount of water running through the power house. He has got two measurements, one on the 15th of March and a guess at it at another time when he and Mr. Trask were there, and then from what he has observed of the water running through the power house. He has not stated how many times he was at the power house. He may have seen that one time in the four years or many times. He may have seen it once in the four years.

The Court: I have assumed that to be a fact.

Mr. Waters: Then it is clear that he has got no data to base his estimate on for the four years run.

The Witness: What was the question in regard to the power house?

Mr. Waters: You have assumed that that is running all the time: How do you know that?

A In reply to Mr. Waters' inquiry I would state that I have known the power house for about 15 years; as near as I can remember I have been there 30 or 40 times and know the amount of water required to operate that machinery; and when the machinery is not operated to the full capacity, there is a spillway from which the water flows and goes back into the tail race below the power house. And when there is 400 inches available in the stream the water would be needed at the power house during the time there is a peak load on the plant, and during other times it would spill over the spillway.

Q What I am trying to get at is this: I want to know how you know there has been a steady stream running through that

power house. You may guess it or you may think it. But how do you know it if you haven't been there?

A If you mean in the sense of knowing it from being there every day, I don't know it.

Q How often have you been there?

A In the last 15 years 30 or 40 times.

Q In the last four years how many times have you been there?

A I don't remember of more than two or three times.

Q That is just what I thought it would simmer itself down to.

Mr. McKinley: And it is not only based on that but on the measurements in the record.

Mr. Waters: And Judge Britt suggests another thing. It is not connected up. Suppose it does come through the power house: How can we further assume that it gets into this waste ditch?

The Court: I take this to be the rule: That without having been there at all he may assume that there are so many inches in one place and so many in another.

Mr. Waters: And if so, so and so.

The Court: Exactly.

Mr. Waters: All right; put it that way. If he puts it as a mere assumption and lets it rest--

The Court: I think you are entitled to have the assumption segregated and labeled differently from the statements of fact.

A I wish to repeat that I do not claim from my own knowledge from having been there, to know this; but assuming from the facts which I do know and from the other facts in

record regarding this ditch being the waste way for the power house water--

Mr. Waters: I move to strike out the assumed flow as being wasted into the gravels as being made up of the factor of the water running through the power house, on the ground that it is not connected up.

Mr. McKinley: He don't state that it runs. He assumes that.

Mr. Waters: To make the record straight, if you don't connect it up we move to strike it out.

The Court: I think it had better be stricken out and the record put in straight. You have a right to know what the witness states to be facts and what he states to be mere argumentative conclusions from assumed data.

Mr. McKinley: Q State your observations again.

A The first fact is the measurement of the 10th of March, 1909, 401 inches. The second fact is another occasion when I was there with Mr. Frank probably two years ago when there was by estimate which I made, not having an opportunity to measure, over 400 inches in the ditch. The third fact is the knowledge I have of the power plant as to its use of water during the non-irrigating season for the generation of power, which is not less than 400 inches if the water is obtainable. And all of the other assumptions are based on the statements by witnesses here (zanjeros) stating that the water from the power plant was wasted through this ditch.

And connecting those matters together, I reached the conclusion that it is more probable ~~xxxx~~ that the average flow is 400 inches through said ditch during the non-irrigating season. That is, 200 inches---

Mr. Llevens: We move to strike out what he considers

probable --

Mr. McKinley: Yes; that can be stricken out; that was not responsive to the question. Let everything go out beginning with the words "and connecting those".

Q Taking the facts that you have stated, and the testimony that has been given in this case as to the measurements of water flowing there, and as to the water being put into that ditch, have you made a calculation as to the amount of replenishment of those waters?

A I have.

Here the Court takes a recess until 2 o'clock p.m.

----0----

AFTERNOON SESSION:-

Mr. McKinley: Q. Will you give the calculations you have made based on the facts which you have last stated and the testimony as you heard it here?

Mr. Haskell: Objected to as irrelevant and incompetent.

The Court; Overruled, Plaintiffs except.

A. The calculation based on those factors gives 126 inches continuous flow for four years as the replenishment to the Cucamonga gravels from San Antonio Canyon.

Q. Explain how the water is replenished.

A. Those waters are placed on the gravel basin on the west side and at a point where the water plane slopes rapidly to the southwest, showing the outlet from the gravel basin in that direction. The lower the water plane is at the outlet the greater will be the draft on this gravel basin, because the hydraulic grade of the ~~gravel~~ percolating water in the basin will be more rapid the lower the water plane is in the outlet, which is marked "Outlet" on exhibit P, with an arrow, and extending from that point to the northeasterly and then to the southwesterly. By placing the replenishing water on the westerly portion of the basin where this outlet and sloping basin exists, the water so placed will build it up, and in building up the cross section of the outlet will retain the water above that point by raising the hydraulic grade at that point. On the other hand, if that water were not placed there, this hydraulic grade would continually draw off water which is in the basin above that point.

Q. That is the outlet shown in the photograph? The same

point?

A Yes, sir; the same point as indicated on the photograph the other day.

Q Have you placed on the map the lines calculated from the other coefficients on Exhibit Xl?

A I have.

Q Explain that.

Mr. Haskell: Is that based on the formula which you testified to last Friday?

A Yes.

Mr. Haskell: Objected to as irrelevant, immaterial and incompetent, and no sufficient basis for the formula upon which to calculate anything..

The Court: Overruled. Plaintiffs except.

A The first one I showed is the calculated discharge of the Y Tunnel and Cucamonga Springs, and calculated from the hydraulic head, being a ~~dark black~~ line in black. It was calculated from the observation of December 13, 1899, as I explained the other day. I have now placed another line below that drawn in red pencil and marked "discharge from Y Tunnel and Cucamonga Springs, calculated from hydraulic head with coefficient M, from March 15, 1909, measurement." The method of doing this was to take the measurement which was made the day we visited the ground with the Court and the attorneys; and by applying the second formula for the value of M, in which there is only one unknown quantity, and solving for that unknown quantity, I obtain the value of the coefficient M for that condition. And taking the value of that coefficient which

would apply to that formation, irrespective of the hydraulic head, I figure the discharge by the formula for each of the otherdates shown on the exhibit marked defendants' exhibit Z1, and drew the red line connecting these points.

The quantities obtained by this calculation would give the discharge for December 13, 1899, as 82.3 inches, whereas there was actually measured on that day 187.85 inches; and for February 3, 1900, the formula gives 79.25, whereas there was actually measured on that date 174.28 inches; for May 7, 1904, the formula gives 60.85 inches, whereas there was actually measured on that date 13.88 inches; the calculation by the formula gives 58.25 inches for July 29, 1905, whereas there was actually measured on that date 7.41 inches; the formula gives for September 19, 1907, 66.8 inches, whereas there was actually measured 33.58 inches; the formula gives 69.6 inches for January 9, 1908, whereas there was actually measured 39.8 inches; the formula gives 70.35 inches for February 2, 1908, while there was actually measured 47.5 inches ; it also gives 66.5 inches for November 22, 1908, while there was actually measured 33.64 inches; showing that the coefficient as taken from the measurement of March 15, 1909, if applied to all the other measurements, gives a different result from that which was measured, and therefore the hydraulic head of well no. 7 has nothing to do with the discharge of the Cucamonga Springs and Y Tunnel, because the formula is based on thecorrect law for waters moving according to the law of gravity. Now if we take the measurement of May 7 , 1904, and by the same method calculate the value

of the resistance M, we obtain other results still different, which I have platted on exhibit Z1 with a green line and marked in green letters above it, "Discharge from Y Tunnel and Cucamonga Springs, calculated from hydraulic head with coefficient M from May 7, 1904 measurement.

Q You have platted it correctly according to the measurements?

A I platted it according to the calculations and the figures are marked in green under the green line. And in this case also the calculated results by the law applying to the subject do not coincide with the measured discharge of the Cucamonga Springs and Y Tunnel, for which reason the hydraulic head at well no. 7 does not affect the discharge of the Cucamonga Springs, but it is being regulated by other causes which do not appear in this analysis.

Q Mr. Finkle, will you make a comparison of the draught and replenishment for the different seasons, beginning with 1904-5 and coming down to 1907-8? The draught and replenishment on the Cucamonga formation there, where the water developments in controversy in this case are situated?

A You are referring to the Ontario Power Company's and San Antonio Water Company's draught?

Q Yes; the San Antonio and Ontario Power Company's draught.

A If the replenishment of the Cucamonga Canyon waters to which I referred this morning--

Mr. Britt: Replenishment of what?

A The replenishment of the Cucamonga formations by spreading the flood waters in the Cucamonga Canyon.

Q What are the Cucamonga formations and where are the replenishments made?

A What I described here as the Cucamonga formations are the two formations which yield the water in the Red Hill ~~formation~~ vicinity, the ancient alluvium yielding artesian water and the recent formation yields the surface waters as applying to the 16th Street wells. And when I speak of replenishment, I mean of those two in that locality.

Q At what place?

A Around the Red Hills, wherever the developments have been made by various cuts, tunnels, wells and cienegas shown on the exhibits in this case.

Taking the Cucamonga Canyon waters which were spread to replenish these formations,--

Mr. Britt: We object to any statement of that nature as being the merest surmise; it does not rise to the dignity of a surmise; it is a preposterous consumption of the time of the Court to listen to a witness coming in here and undertaking to say how much the waters around the Red Hills are replenished by the operations described here by Mr. Trask and one or two other witnesses, miles and miles above the Red Hills, in the matter of spreading water around over the rocks.

The Court: The objection is overruled. Plaintiffs except.

Mr. Haskell: It is further objected to on the ground that it is a mere assumption on the part of the witnesses Mr. Trask and Mr. Finkle to make an arbitrary estimate that without the spreading only 20 per cent of the rainfall would

sink into the ground.

The Court: Still overruled. Plaintiffs except.

A. I will begin my answer anew, confining the matter first to the replenishment of the Cucamonga formations from the season of 1904-5 to the season of 1907-8 inclusive, being four years. I have made two estimates within which limits the amount would unquestionably fall. It is, of course, apparent that water spread on the gravels will not all be supplied to the formation below, and that a certain percentage would have to be lost by evaporation and plant life. I have made one calculation at 20 per cent. of the amount sprrad out as being evaporated and consumed by brush and other plant life, which would give the total replenishment from the Cucamonga Canyon for the four years as 232,8 inches continuous flow from the Cucamonga flood water.

I have also made an estimate which would give the very lowest that could be obtained, by deducting twice as much for loss by evaporation and plant life, or 40 per cent. of the whole, and on this basus the total replenishment for the four years would be a continuous flow of 174.6 inches.

Then taking the San Antonio Canyon water and basing the loss on 40 per cent. of the amount of water applied and conforming to the two estimates which I made previously of the quantity applied,-- basing one on the estimated flow as given by the zanjeros and our measurements, and basing the other on such measurements as we have, I get the minimum amount of replenishment which could have been supplied by

the San Antonio Water Company from San Antonio Canyon as a continuous flow of 37.5 inches and as a maximum continuous flow of 75 inches, and I would say that it would certainly come within those limits. Now if we take the total amount of water for the same four years taken out by the San Antonio Water Company and the Ontario Power Company, we find that the total draft both from the Eady Tunnel and the 16th Street wells for those four years would average ~~is~~ 163.1 inches. Hence, if we take the minimum estimate of replenishment which from both canyons would be 212.1 inches, we would have a surplus of 49. inches of replenishment over and above that draft for that period; and if we take the maximum estimate of replenishment, as I make it here, we would have 144.7 inches excess of replenishment over and above the draught.

Q Will you compare the period from 1895 to 1908?

A Taking the total draught of the San Antonio Water Company and the Ontario Power Company from the ~~first~~ record given in the transcript in in this case and using the quantities testified to for each year, I find--

Mr. Haskell: Q What are those quantities testified yo?

Mr. McKinley: I suppose counsel will have an opportunity to cross examine after a while.

The Court: They are entitled to know as they go along what the witness is predicating his statements on. His statement is so very general that it gives no key at all to the basis he is proceeding on.

Mr. McKinley: Q Very well. Explain more fully what you base it on.

A I have two tabulations here made up from the figures given in here in Mr. Trask's tabulation; one of them is the San Antonio Water Company's pumped water and is as follows:

1895	30 inches
1896	30 "
1898	25 inches
1899	50 "
1900	220 "
1901	282 "
1902	360.5 "
1903	152 "

each of these quantities being for six months or estimated for six months. Then I have the following:

1904	149 inches
1905	59 "
1906	00 "
1907	31 "
1908	74.7 "

The last five years measurements being given for the whol e year. Then I have the following, the draught from the Eady Tunnel:

1898	30 inches
1899	120 "
1900	104 "
1901	118 "
1902	203.55"

which is my own result that I have adopted;

1903	220 inches

1904	180 inches	
1905	139	"
1906	155	"
1907	119	"
1908	155	"

an amount for the entire period of 141 inches.

The Court: Q. That ispumped water?

A. That is the Lady Tunnel draught.

Q. You segregated that from the pumped?

A. Yes, sir. And now I have grouped them all together for the purpose of making this comparison. If we take my minimum estimate of replenishment, after deducting the larger percentage and taking the smaller figure for San Antonio Water, the total excess draught from the locality by the San Antonio Water Company and the Ontario Power Company for this 14 years period would be 98 inches. If we take the maximum estimate of replenishment which I made, the total excess draught by both companies for the 14 years period would be 51.8 inches.

Q. Excess over what?

A. Over the amountthat they have replenished the formation as per my various estimates on the subject.

Q. Do you mean year inches?

Mr. Haskell: I would like to understand what you mean by the average. Does this average extend back to the year 1895?

A. It does extend back to that year.

Q. And before the Lady Tunnel was in operation?

A. The Lady Tunnel was in operation before that, but the San Antonio Water Company didn't have any water from it till

1898.

The Court: It wouldn't make any difference who owned it if the water was taken out, for the purpose of comparison.

Mr. McKinley: Q. Have you made a comparison from 1899 to 1908?

A. I have.

Q. State that.

Q. Taking my maximum estimate on the replenishment from both sources since 1899, the draught has exceeded the replenishment 81.5 annual inches. That is, for the whole time, from 1899 up to the present year, and includes the replenishment artificially only. Of course, the natural replenishment is not considered in any of these estimates.

The Court: You speak of the draught ~~increasing~~ the replenishment by a certain percentage:

Do you mean the San Antonio, ~~power~~ water Company and the Power Company?

A. Yes, sir; I limit it to that, and the 81.5 inches has been a draught on the natural water sources in the basin, all the remainder of the draught having been made up by replenishment.

Mr. Britt: Q. I understood you to say allowing a maximum replenishment it was 1 inch and a fraction.

A. 81.5.

Q. That is, on the maximum replenishment?

A. On the maximum estimate which I made.

Mr. McKinley: Q. What effect on the outflow does the pumping on the 16th Street wells have, in your opinion?

The Court: I am not sure that I understand the question.

On the outflow of what?

Mr. McKinley: The outflow of waters from the basin. He has testified to an outflow at a certain point.

A Referring to defendants' exhibit P, and to the point marked "outlet" on that exhibit, the natural outflow occurs in that direction, to the southwest; and when thewater in the basin is higher than the water in the outlet, the discharge will be more rapid than when the conditions are reversed. If you depress the head in the basin the discharge from the outlet will be diminished and therefore by pumping the wells on 16th Street which are located in the upper part of the basin where the water plane is high, the result will be to diminish the other discharge from the outlet, ~~xxxxx xxxxx~~ by lowering the water plane at that point. And all the draught of pumping is not a draught on the basin, but only a portion of it.

The Court: That is, I suppose, on the theory that there is some kind of a dike below there?

A On the assumption that the Red Hills constitute a dike, and at the point of outflow there is a dike at a much greater depth, as we know by wells sunk in that neighborhood over 200 feet in depth, and the outflow would ~~xxx~~ occur over the lowest part of the dike, which I suppose we know is somewhere about the point marked "outlet" on exhibit P, as the dike again crops at Sycamore Tunnel west of that point; and between that point and the Red Hills the dike is much lower either by erosion or by the natural inequality in its original uplift.

Mr. McKinley: Q How do all the present draughts compare with the supplies to that basin and the underground waters

of it?

A The present draughts on the basin are considerably below the supply, and the water plane since 1905 has been rising every year in spite of the draughts which now occur, and the supply is well within the limits of -- the draught, I mean, is well within the limits of the supply to the basin as it is made by the natural sources and by replenishment of the San Antonio Water Company.

The Court: Q You mean by that that if the draught were to keep up for the next five years with the rainfall we have beenhaving kept up, the water plane would continue to rise?

A It would continue to rise; and if we take it on the average period of 38 years rainfall, which is the longest record we have, the present draught is well within the supply.

Mr. Stevens: Q Without the replenishment?

A Yes, sir; without the replenishment. But with the replenishment they are greatly below the supply.

Mr. McKinley: Q You have a photograph of that 19th Street diversion?

A I have.

Q This, of course, represents the water which we saw flowing on the 15th of March, and being carried over into the Cucamonga washes?

A It represents the water of the San Antonio Creek which is carried into the ditch, the San Antonio Water Company-- the 19th Street ditch-- as we saw it on the 15th of March, 1909.

Q That is a correct photograph of the subject matter?

A It is.

Mr. McKinley : I offer it in evidence.

EXHIBIT Z-7.

The Court: Just where was that taken?

A On the 15th of March, 1909, the day we were there wit h the attorneys and with your Honor.

Q But just where?

A From the bank of the ditch, about midway of the excavated open ditchx from the end of the pipe line to the wash.

Mr. McKinley: Q Have you some topographic l maps of the Cucamonga quadrangle?

A I have two of them which I have marked for the purpose of illustrating certain points in my testimony. This one I have marked with the gravel basin and the Red Hill formation.

Q You may explain it.

A The portion which has been explored through the top covering so as to reveal its character as the ancient quaternary deposit is encircled by a red border-- a red line, drawn in red pencil, and lettered "outline of Red Hill formation as shown by wells."

The Court: Q That corresponds substantially with this red marking of the red alluvium deposit on exhibit F?

A Substantially so; there are some slight differences. I came down from Base Line where the wells exist, while the other comes to Base Line. I made one or two slight

c hanges, but there is no material difference.
And then I have drawn a blue line through the top of the hills which I have marked in blue pencil, "Strike of Red Hill Formation along apex of fold", and the figure 4 in pencil refers to that section 4 and has nothing to do with the lettering, the lettering only being in blue pencil. That line is drawn for the purpose of showing the trend of that formation as nearly as we can tell from the physical features on the ground, taking the various apexes of the Red Hills as they extend from the westerly small hill to the small hill at the Sunset well.

The Court: You are speaking of the surface indications?

A Yes, sir.; as we have no subterranean excavations which would throw any further light on that surface.

On this same map I have tinted in a yellow shade what I estimate is the valuable portion of the gravel basin lying above this dike or fold of the Red Hills, and I have lettered that "Outline of gravel basin above Red Hills" in yellow pencil. While, no doubt, this gravel basin has larger limits than those which I have given to it, these are what I consider d its useful limits within the Cucamonga Canyon watershed. Its limits extend over into the San Antonio Canyon and probably also to those in the east; but over into the east I think very shallow as compared to that on the west. And the other numbers which I have written on this map are the numbers of sections in black pencil. The other portions of the map are as shown by the government w with explanations of the government topographical work at the time it was made.

The Court: Before you put any marks on it it was just the same as the map in government paper 219?

A It was. It was taken out by me from the giverment paper 219.

Mr. McKinley: Q Do you know about the existence of the washes as shown there on the map?

A I do.

Q What do you know about them?

A Those washes are shown correctly on that map. The main wash from the Cucamonga Canyon running through the gravel basin runs down for a certain distance, one mile or thereabouts, from the mouth of the canyon, and then forks into a number of branches, of which all except one run to the west of the Red Hill, the most easterly one running through the Red Hill at the place where the Cucamonga Springs emerge. And there are five well defined washes running to the west of the Red Hill as shown on this map.

Q And what connection would the washes have with building up that debris cone?

A The washes have been the means of building up the debris cone; and on the west where the washes are more numerous, therecent material is deeper and more abundant, while on the east where the wash is confined to a single channel it is running nearer to the surface of the ancient material, and at the Red Hill almost on the surface of it.

Mr. McKinley: We offer this in evidence and ask that it be marked

Defendants Exhibit 2-8.

Q Have you another map?

A Yes; I have another map showing the hydrographic contours. To this map I have only added the names of certain wells as the Upland Water Company at its well, "Hermosa Water Company" at its well, the "Sunset Water Company" at its two wells, and the "Old Settlers Water Company" at its well.

The Court: How are the wells indicated?

A They are indicated on the original map. I have only added the names of the wells. The map otherwise shows the hydrographic contours, or, in other words, the contours of the subterranean water as of the date when that was made, which was 1904 and 1905, during the low period of the water plane.

The Court: I am not sure that I understand that hydrographic contour: Is that supposed to be the top of the saturated plane?

A It is the top of the saturated plane; and any points on these gray lines, marked in gray figures, as distinguished from the Brown line, marked in brown figures, refer to the top of the saturated plane; and any points on those lines which have equal elevations, are level-- t that is, in the same level plane.

Q They are measured from sea level or from the surface of the ground?

A From sea level; and the same bench mark is used as for the surface topography. This is practically a double contour map. To determine the flow of the water under ground

from these contours, any line drawn at right angles will show the direction in which the water travels; and taking the 16th Street wells from 1 to 5--

Mr. Britt: We are going to object to the reception of this map simply because nobody knows anything about its correctness, and I would like to inquire of the witness if he is describing merely what he sees on the map or undertaking to assert the truth of the statements made there.

The Court: Have you verified those contour lines?

A I have. I have taken the well elevations of those years and find that they are platted exactly. And there is another exhibit put in by the intervenors which corroborates them.

Mr. Britt: I want to know if he is describing simply what appears on the map or the result of his own observations?

A Starting from the 16th Street wells, 1 to 5, which are numbered on this map 73 being the same as no.1, 74 being the same as no. 2, 75 the same as no. 3, 76 the same as no. 54, and 77 the same as no. 5,-- taking those wells and starting from those I draw a line at right angles to the contour of the underground saturated plane, and the water would flow to the west of the Red Hill from that point to the outlet of the gravel basin west of the Red Hill as stated in my former testimony. The only wells of the San Antonio Water Company which do not do that would be the Haskell wells, which are marked here as 79; and if you were to be guided by the hydrographic contour in that relation, the outlet from these wells would appear to be

to the east. But as explained by Mr. Trask, those are in a corner of the basin where the water is practically at rest. The dike or dam below that which would prevent the--

The Court: Do you mean that the water starting from Cucamonga Canyon will flow down till it strikes that dike?

A It would all be diverted to the west.

Q And you wouldn't have that in any instance in the springs?

A No, sir; except what goes into the ancient formation at the foot hills. I will with a red pencil draw a line from the 16th Street well no. 3 showing the way in which the water from that one would travel. I have drawn a red line from well no. 3, which is well no. 75 on this map, in a southwesterly direction, at right angles to the underground contours, showing how the waters from that well would travel if not pumped out.

Q Is that to the west of the small Red Hill also?

A That is also to the west of the small Red Hill.

Mr. McKinley: We offer this map in evidence and ask that it be marked

DEFENDANTS EXHIBIT 29.

Mr. Britt: We object to the reception in evidence of the map on the ground that it is not in any way authenticated and that the statement of the witness that he has verified it is a mere general statement, without showing the manner in which it has been verified, and that that statement ought not to be accepted--

The Court: I understood him to say that he verified it

by the measurements in evidence in this case.

A I used the measurements testified to by Mr. Trask, myself and others to verify it, and it agrees with all the measurements.

Mr. Britt: Then they are entirely insufficient to justify the reception in evidence of the whole ~~property~~ map which covers many, many miles.

A I wish to be understood that my verification does not go beyond these wells in controversy; and if I conveyed any other idea, I wish to have it understood that I didn't go to the trouble of verifying it beyond those limits.

The Court: The objection is overruled. Plaintiffs except.

Mr. Britt: May we inquire, so as to more intelligently examine this map, as to the times when the witness made his verification, and, secondly,-- First, the dates when these contour lines are assumed by him to have been made, and, secondly, the time when he actually made the verification that he has testified about?

A The times to which this map relates are the years 1904-5 or that season of 1904-5, and I have verified it on two different occasions: once a year ago-- no, about four months ago, I should say.

Q In what way? From testimony in this case?

A From records which are put into this case at the former trial, and the records which Mr. Trask and I made and which have since been put in, and I have gone over them within the last two weeks . I went over the matter one evening in the hotel.

Q By reference to the same data?

A Yes.

Mr. McKinley: Q Will you describe the pipe lines to the west from the Lady Tunnel as you found them in '99?

Mr. Haskell: Objected to as irrelevant, immaterial and incompetent.

The Court: Overruled. Plaintiffs except.

A At the time of my first visit in January, 1899, there were two pipe lines going west from that locality. One was an eight-inch diameter steel pipe line which was taken out of a box at the mouth of the Lady Tunnel, and this pipeline had a capacity of 54.4 inches. Another was an iron pipe line which left what is known as reservoir no. 5 and passed the Park Hotel going south to section 16. This pipe line had a capacity of at least 21 and a fraction inches. I can't state how much more, as that is the only measurement I have of it. Then in the summer of 1899 Mr. Stowell constructed a 22-inch cement pipe line from the Lady Tunnel to what is known as the Stowell measuring box on the east side of the Ontario Colony tract, which pipe linehad a capacity of something over 200 inches. That was placed in commission some time before the 25th of August, 1899, when I made the first measurement of water passing through it. The 8-inch pipe line went to Upland in the Ontario Colony. The smaller pipe line by the Park Hotel I am not conversant with its ~~distance~~ except so far as going to section 16. And the 22-inch concrete pipe terminated on the line between the Ontario colony land and the lands of the Cucamonga Fruit

Land Company, from which point the San Antonio Water Company laid its own pipes to carry the water.

Q State whether you made any observations in 1899 as to whether the wells on the west side of the Red Hill were in sympathy.

A I did make a careful examination of them at different times.

Q State your observations and your opinions resulting therefrom.

A The time I speak of in 1899, extending from the middle of March up to December of that year,-- some of the wells which were bored in the vicinity of the Lady Tunnel were cut into the tunnel and other wells were either siphoned into the tunnel or the water was standing at a short distance below the surface. There were four such wells when I made my first visit, in addition to which there was another well of the Cucamonga Water Company which was drilled that summer by Mr. Beck, and a sixth well which was being drilled that year by Mr. Stowell northwest of the 90-acre tract. By observing the levels in these various wells and the level in the tunnel, I found that there ~~was~~ were differences in level between the water flowing out of those wells which were as great as 87 feet, even between wells only 20 feet apart, which in my opinion demonstrates beyond any question that those wells were not drawing water from the same strata or from strata which were in any manner in contact. Otherwise the thin partition of 20 feet would have broken through and the wells would have been drained one into the other.

This is only one example. There were other examples of wells 50 feet apart and 77 feet apart in which there were similar discrepancies or nearly as great discrepancies in the level of the water. If these wells which exhibited these characteristics had been drawing from the same strata they would have acted as a number of hydrants from the same pipe line: the water would have stood at the same level or elevation in all of them; or they would have acted as the same number of standpipes from the same pipe line under pressure. The water would have risen to the same level in all of them.

Q What is your opinion then?

A My opinion, based on these observations of facts, is that there was no sympathy between the various wells at the west side.

Q What do the channels on the east and west side consist of?

A Those channels consist of coarse layers laid down from the various canyons in the ancient formation. When the precipitation was heavy the erosions from the mountains was heavy and consisted of coarse particles, and these were carried and deposited in stringers along the line of flow of the water. Again, when the period of lower precipitation occurred, the finer particles of sediment would be carried down and covered over these stringers. And we find these stringers are the same as those in all fluviatile deposits of this nature. Namely, they are laid down along the line of the course of the water, and that there are a number of them from each canyon, some

[illegible]

from the San Antonio Canyon pointing toward the Red Hill, some from the Cucamonga Canyon pointing in different directions towards the Red Hill formations, and others from Day Canyon and Deer Canyon. During this period when this formation was laid down, the great preponderance of fine material made a complete separation between these various channels, except where one would cut across another from a different canyon. And there are a number of such developed by well boring records where the well drillers, although they find gravel, don't find water, for the reason that the channel from some other canyon has cut it off and left the dry gravel. These stringers are all laid down along the line of the flow and can be located in their relation to the Red Hill alluvium by laying a rule or straight edge on the map from each of the canyons , and in this manner it is possible to form an opinion as to what effect one well has on the other, by showing that the channels pass through ~~the~~ a number of wells, starting from a given point.

Q Speaking of the different canyons, in what degree do the canyons other than the Cucamonga Canyon in your opinion contribute to the Cucamonga basin?

A I have made a computation on that which is based on the matter of probabilities as shown by the contour maps and the topography indicating the probably swing which the stream has had from each of these canyons.

Mr. Britt: We object to the testimony as being an unprofitable surmise, and too remote to justify the Court in listening to it.

The Court: You are taking the watershed of each of the canyons?

A Yes; taking the watershed and run-off from each of the canyons and then taking the arc which would strike the Red Hill formation from each of them.

The Court: The objection is overruled. Plaintiff excepts.

A First beginning on the west is San Antonio Creek. I assume that all of the water which is supplied after the diversions, in that creek, would be about 40 per cent. of the amount sinking, or according to the Arrowhead Reservoir Company's experiments would give a continuous flow of 160.5 inches tributary to both the ancient and recent formations.

Q At the Red Hill?

A That is at the Red Hill. I am speaking entirely of the locality at the Red Hill covered by the various wells in controversy in this case, and using also the Arrowhead Company's experimental curve for run-off, and deducting the probable diversions at the mouth of ~~that~~ Cucamonga canyon 80 per cent. of the running water would in all probability be tributary to the Red Hill locality. It would leave 364.2 inches continu-ous flow from that source.

Taking Deer Canyon, I estimate that from the location of the arc of that canyon, after making deductions for the surface diversions, that there would be 40 per cent. of the remainder or 155.2 inches tributary to the Red Hill locality. This is also figured by the Arrowhead curve.

Taking Day Canyon, I can only estimate that 10 per cent. of it could in any probability be assigned to these Cu-

camonga formations where the present wells are located; and after deducting the surface ~~[illegible]~~ diversion I find that that would produce 24.1 inches. This is also according to the Arrowhead curve. The total of these supplies covering a period of 38 years run-off by the Arrowhead curve would be 704 inches under a foud-inch pressure.

The Court: You mean the average annual supply?

A The average annual supply to the entire territory which is covered by wells on the west, the most westerly being 16th Street well no. 1, and the most easterly being the Johnson well, as shown on exhibit F.

Now, if we add to that the replenishment of the San Antonio Water Company on the lowest estimates I made of such replenishment, the total supply for the last four years when this work of the San Antonio Water Company has been in progress, has been 916.1 inches (annual inches) continuous flow.

The Court: Q Have you made any estimate of the aggregate amount being taken out of the same territory?,

A I have, so far as the artificial draught and cienegas which flow on the surface are concerned; but I cannot make any as to the discharge to the west which goes to the Chino artesian basin.

Q I mean taken out by wells and tunnels and so on.

A I have the same estimate which Mr. Trask made in his tabulation. I have no others.

Q What was the total?

A It is a variable quantity but runs from 389 inches in 1885 up to 561 inches in 1908. but some of these latter meas-

urements are not annual inches, and it is impossible to tell just how much deduction should be made for them. I am unable to say what the equivalent would be in annual inches, because some of the wells are not included in that and we don't know the length of time those were pumped, and it would be something slightly less than this figure; but how much, I can't state. There seems to be in the table on page 2555 of the Reporters transcript, to which I am referring also, a date when there was a total draught of 738 inches. This excessive draught was caused by the Y Tunnel and those developments which had then been instituted, as well as by the higher rainfall up to that time or just preceding that time. But even that draught would appear to be within the limit of supply if the water plane were lowered so that none of the water would be lost to the west or not very much would be lost by exudation to the west.

The Court: What are those replenishments again?

A The annual inches supplied naturally to these formations are 704 inches, and with the replenishment by the San Antonio Water Company 916.1 inches.

Mr. McKinley: Q Have you made an estimate also on the Newell curve?

A Yes, sir; and by that curve I find that the amount is less. The total replenishment by the Newell curve, taking the minimum estimate of replenishment, by the San Antonio Water Company, for the whole average period of 38 years of known rainfall, would be 682.1 inches. In both of these estimates I wish to state that I have allowed liberally

for the Canyon diversions of the San Antonio Canyon and Cucamonga Creek and Deer Creek and Day Canyon. I haven't allowed the actual amounts measured of San Antonio Canyon, of 764 inches continuous flow; I have allowed 150 inches continuous flow in Cucamonga Canyon, 100 inches for Deer Creek, and 75 inches for Day Canyon, and I haven't taken into account any possible return water from these diversions, although many of them are used within this watershed and overlaying these gravel beds. I left that out for the sake of being conservative, so as not to overdraw the estimate.

Q What in your opinion becomes of the excess?

A The excess which is not taken by these various developments and which is not now manifested in the rising of the water plane which is occurring every year in the present condition of the rainfall, is being discharged to the southwest and contributes principally to the artesian basin on the Chino Ranch and possibly to some of the subterranean water supplies further to the west in the vicinity of Pomona, and also to the Santa Ana River in its reaches above the Rincon Narrows.

Q What if any bearing do you consider the conditions shown as to the water plane have upon your opinion ? Confirming it or otherwise?

A The elevations of the water levels of the various wells as testified to by all the witnesses in this case confirm my calculations absolutely. They show that prior to 1905 while the rainfall conditions---

Mr. Britt: We object to the statement of the witness as to what the testimony of other witnesses shows. It is not

a matter for expert evidence and it is a question for the Court entirely.

The Court: I think the objection is well taken.

Mr. Britt: And we ask that the statement of the witness as to the testimony of witnesses confirming his deductions be stricken out.

The Court: Stricken out.

Q What bearing does the elevation of the water in the different wells have upon the matter of estimating the amount of water received?

Mr. Waters: Objected to because it don't say received from what. Cucamonga Creek, San Antonio--

Q Estimate of all waters received in that basin.

A The elevation of the water plane in the wells since I have been acquainted with them demonstrates the correctness of my computation of supply to the basin, showing that for the dry cycle of years the water plane descended conformable to the rainfallm, and that since the dry cycle of years, terminating in 1904, the water plane has been rising also conformably to the rainfall, showing that the draught has been normal on the basin, and that if the draft had not been as great as it was, the surplus would merely haveescaped through the outlet to the southwest and would not have benefitted anyone in this locality but might hav e benefitted others in lower localities.

Mr. Haskell : What is it that you say shows that last?

A The elevations of the water plane in the various wells which I have measured since 1899.

Q You mean wells of which you have given measurements here?

A I take wells to which I have testified as to measurements on various dates.

Mr. McKinley: Returning to the matter of the channels on the east andwest side, you spoke the other day of some recent deposit on the west side: What do you find in the way of recent deposit in those channels?

A On the west side the recent deposit has overlapped the ancient between the small red hill and the large red hill shown on exhibit F, and west of the red hill-- the small red hill-- has entirely covered the lower level of those red hills; the deposit is very shallow between the two red hills, as demonstrated by the Lady Tunnel where the contact 2000 feet from the portal of the tunnel was found to be 80 feet below the surface. Further west, the Sourwine shaftx, which is shown on defendants' exhibit D, and marked "Sourwine shaft", demonstrates that the recent deposit is very deep.

At the easterly channel of the Cucamonga wash which passes through the Cucamonga Springs, the deposit of the recent detrital material is extremely shallow, as is demonstrated by the rising of the waters in that channel, there not being any coarse material through which it can escape. And further, by the cuts which were made and which have been only to a depth of 6 or 7 feet in some places, have unearthed a peat matter which exists in the cienegas or formation in the channel of the Cucamonga Springs. And also the Y Tunnel where the excavations into the ancient gravel have

shown the sand filling between that ancient gravels to be of a yellow and red color as distinguished from the gray gravels of the recent.

Mr. Britt: Q The testimony of the deep formation in the creek bed, from what are you undertaking to say that?

A I saw that in the last cut that was made there (about two years ago, I believe) for increasing the flow of Cucamonga Springs temporarily.

Mr. McKinley: Q Have you made any comparison of the discharge of the Lady Tunnel and the water levels in wells nos 3 and 9 in 1907, referring to no. 9 of the San Antonio wells?

A That is the same as the number 14 of plaintiffs?

Q Yes.

A I did.

Q Will you give your comparison.

A Taking the measurements of levels in those wells between the dates January 11, 1907, and August 30, 1907, between which dates there was no pumping from well no. 3, and comparing them, we find that by manipulating the bulkhead in the Lady Tunnel so as to draw down and raise alternately, the level in well no. 9 or 10, as it is known by plaintiffs--

Q 14.

A 14, I should say, of plaintiffs-- there was no effect upon well no. 3 of the San Antonio Water Company north of 16th Street. But this well continued to rise in elevation throughout that entire period, while there were marked fluctuations in the level of well no. 9.

Mr. Haskell: I want to understand what manipulations of the hydraulic head in that tunnel you refer to.

A The manipulations are these: That in January, 1907, the bulkhead was completed in that tunnel, and from that time on during that year the flow of the tunnel was regulated by opening and closing the bulkhead. Prior to that time there was no way of regulating that flow and the tunnel was flowing freely the whole year. But the measurements which are given in various places in the Reporter's transcript show that the flow fluctuated from 46 inches--

Mr. McKinley: Q By manipulations you don't mean anything but changes in the bulkhead, and not changes made for the purpose--

A No; there was no artificial manipulations except such as occurred by the zanjeros in the regular line of their work.

Mr. Haskell: You say that it was changed: Where is the testimony in the case upon which you base the statement that it was changed? Where is the time and place and page of the transcript?

A The testimony is first by the measurements from the Eady tunnel when the bulkhead was changed.

Q You mean the measurements of the flow out of it?

A That is the first evidence in the record. The second is the testimony of such witnesses here like Mr. Trask and others who have handled this company's affairs and state that the flow was regulated from that tunnel by closing the bulkhead and diminishing the flow at certain times and increasing it at others.

Q But you have made the statement a few minutes ago that as this change was made up and down it had this effect.

A On well no. 3.

Q Where was the moment of time that it was changed up and down?

A I am not figuring this down to a minute, but I think we can get it by days and months, which is ample to cover the case. The effect on well no. 3 after the bulkhead was open so as to flow more water is exhibited by these measurements.

The Court: Well no. 3?

A Yes; of the San Antonio Water Company.

The Court: That is not cut into the tunnel?

A No; but it has been claimed by plaintiffs that there is a relation or interference between the Eady Tunnel and the wells on 16th Street. I am simply applying this table to my opinion to show that the rise and fall of the water in the Eady Tunnel had no effect on that well.

Q Do you say that it does or does not show any sympathy?

A It shows no sympathy.

Mr. Haskell: You haven't stated yet that at certain periods of time or any period of time as shown in the testimony in this case-- Point it out, where when that bulkhead was closed that it didn't raise the water in well no. 3.

A I can point that out. Do you want that now?

Q You say you have all the figures you are relying on.

The Court: You had better take that up on your crossexamination. In so far as you want to understand him as he

goes along it is all right to break in; but when it comes to cross examination, it had better be identified.

Mr. McKinley: Proceed.

A I have completed my answer as to the effect of closing the bulkhead and opening it.

Q Have you a diagram illustrating it?

A I have a diagram showing its--

Q You may give the figures in connection with the diagram.

A This is a diagram entitled "Hydrograph showing relation between discharge from Lady Tunnel and water elevation in well no. 9 and the want of relation between these and well no. 3, for the year 1907." The lower line on this diagram at the foot is lettered "January, February March, April, May, June, July, August" being the months during which the observations were taken, and are extended to the month of August only because after that the San Antonio Water Company began pumping well no. 3, which would have made any further comparison for that year impossible. The next feature of the diagram is a scale on the lower part of the left hand side of the diagram, which is lettered "Miners Inches" and denotes the miners inches under a four-inch pressure of the various subdivisions or lines on the diagram. Above the double line drawn to separate this scale of miners inches from another scale above, is a scale on the left hand side entitled "elevations above sea level, beginning with 1275 feet above sea level and ending with 1375 feet above sea level. The lowest line on the diagram is called "discharge from Lady Tunnel in

miners inches under a four inch pressure. And after plotting in the measurements taken from the Reporter's transcript in this case on those dates, those points are joined by straight black lines between each of the points. There are two legends above this line: One is bulkhead closed, which occurs between the day in January and the date in February, on which the discharge from the Lady Tunnel fell very rapidly as the result of closing the bulkheads between those dates. From that point the rise in the Lady tunnel was very gradual up to the latter part of April, due simply to percolation of water by the bulkhead, or there might have been slight changes in the bulkhead, but no radical movement of it.

Then comes another legend "Bulkhead open" between that date in April and about the middle of May, when the discharge from the Lady Tunnel accelerated, due to the opening of the bulkhead. From that point the fluctuations of the bulkhead were slight, the largest one occurring about the middle of August when the bulkhead was not any further opened to discharge any large amount of water. The next black line above is entitled "water elevations in well no. 9" near the head of the Lady Tunnel. This line is the reverse of the other line and shows the rise and fall of water in well no. 9 acting directly with the tunnel as the bulkhead was changed. When the bulkhead was closed this began to rise, showing the relation there; and when you come to the bulkhead being open, the elevation fell by the water being drawn off. This occurred in August ; when the bulkhed was opened the well fell.

The upper line on the diagram is lettered "water elevations in 16th Street well no. 3 of San Antonio Water Company" and shows the uniform condition of the water level rising continuously in spite of the fluctuations of these two elements. If there were any relation or sympathy between the Lady Tunnel and well no. 3 of the San Antonio Water Company the water level in that well would necessarily have corresponded to the water elevations in well no. 9 by some interval or regular formula. But there is no correspondence, and the drops in well no. 9 are not communicated to well no. 3, and I conclude that the two are separate and distinct, the Lady Tunnel drawing its water from the ancient formation through artesian wells, and the 16th Street well drawing its water from the gravels which are distinct.

Q. Do you know whether well no. 3 was being pumped?

A. Yes, sir, throughout pumped that was the reason I took that. When it was being pumped you could tell nothing about it.

Mr McKinley: We offer the diagram in evidence, which has just been explained by the witness and ask that it be marked "Defendants" Exhibit 210.

Diagram admitted in evidence, marked

DEFENDANTS' EXHIBIT 210

Mr McKinley, I have you made a similar comparison and diagram for 1908, Mr Fiskel?

A I have.

Q Will you produce the diagram and explain.

A This diagram, which is called hydrograph, showing relation between discharge from Eagle tunnel, the water elevation in well number 7, and the rest of relations between these and well number 2, for the year 1908, has been constructed as follows: Taking the measurements of water levels and of discharge measurements from the Eagle tunnel which appear in the reporter's transcript in this case, the diagram covers a period from January to June, 1908; As the San Antonio Water Company began pumping the latter part of June, I could make the comparison for no longer period. The months are indicated on the bottom of the diagram, as in the diagram last referred to for 1907; there is a scale on the left hand side, beginning with 0 and terminating with 250, which is marked miners' inches, and indicates the significance of each line across the diagram.

Across this scale are two parallel lines drawn, between 750 and 1300, to separate it from the scale above; this scale is marked elevations above sea-level, and refers to the system of levels and bench marks which has been used

by Mr Trask in this case in giving his elevations of wells, and which I have also used in my testimony in giving elevations of wells; the scale begins with 1300 feet, and terminates in 1400 feet, covering a range of 100 feet in elevation.

The lower line opposite the miners' inch scale is the discharge from the Eddie tunnel, as measured and shown in the transcript at various points in this case.

The points marked with round black dots are measurements located at the proper time in the month, and these are joined by straight black lines, to form a broken line, indicating the regimen of the flow from the Eddie tunnel during that period; this is radius, discharge from Eddie tunnel, in miners' inches under four inch pressure.

Between the first and the second observation the words "bulkhead closed" are written to indicate that the bulkhead was closed between those dates, the discharge of the Eddie tunnel being very greatly diminished indicating that fact. From that point to the next observation there might have been some very slight manipulation of the tunnel bulkhead, or the increase might be due to leakage on account of the accumulated head behind the bulkhead; but between the observation about the 20th of March, and the latter part of March the bulkhead was opened, and the legend is placed on the map "bulkhead open", and that is indicated by a rapid rise in the discharge from the Eddie tunnel;.after that the line descends by regulating the bulkhead to discharge less water until the latter part of April, when it is again opened wider and from that point seems to be maintained stationary , up to

the last measurement, in the early part of June, before pumping began on well number 3.

The line above this one in the middle of the diagram, is marked water elevations in well number 9, head of Lucie Tunnel; this line is the reverse of the discharge flow, as the opening of the bulkhead lowers the waterlevel in well number 9, and the closing of the bulkhead raises it; and we find with the bulkhead being closed, the water level in that well rose rapidly, and when it was opened we find that it declined rapidly; this was again repeated at the second partial closing and reopening, so that the line shows the reversal of the line below.

Above this, at the top of the diagram, is a black rising line, on which are a number of dots, giving the elevations, at the time measurements were taken in well number 3, and connected by straight black lines, and refer to water elevations in the 16th street well number 3 of the San Antonio Water Company; the last line referred to, well number 3, shows a steady raise of the water plane in that well, regardless of the fluctuations in the tunnel as to its discharge, or as to its effect on well number 9, and is positive absolute demonstration of the fact that there is no relation between those two developments, this being the second year in which the same thing has occurred, and showing that well number 3 derives itx its water supply from another source, namely the reservoir in the recent gravels, while the tunnel derives its water supply from the ambient formation, and has a separate and distinct supply in the early quaternary deposits, underlying the gravel reservoir.

Mr McKinley; we offer in evidence the diagram referred to last by the witness and ask that it be marked Defendants' Exhibit 211.

The diagram admitted in evidence and marked Defendants' Exhibit 211.

Mr Waters: I move to strike out all of the last sentence of the witness, upon the ground that it is incompetent, and does not state an opinion, even for an expert, and is inadmissible and argumentative. (Answer read.) I move to strike out all of the answer after the words, "and is positive absolute concentration-" from and including those words.

Mr McKinley: We have no objection to that being stricken out.

Q Have you made a diagram of the east side drainage, the Y tunnel and the Gunnison Springs, in 1930?

A I have made a diagram of that drainage, the discharge on the east side, from 1900 to 1930.

Q Well, put it up and explain it.

A This diagram is called hydrograph showing fluctuations of discharge on east side of Red Hill from Gunnison Springs, Y tunnel, and from drainage, from 1900 to 1930, inclusive.

I wish to state that 1904 is written on here but it should be 1900; evidently the straightedge put that on there by mistake, because the point set here at 1900.

The Court: Just change it with a pencil.

I have substituted the figures "1900" for "1904", in the title as just read.

This diagram shows at the bottom a space for each year,

from 1884 to 1904, and shows on the left hand side a scale of miners' inches, running from 0 to 600; the various measurements shown for each of the years are taken from Exhibit 32 of the plaintiff's in this case, and begin with the measurement of 1888, made by Mr. Fitzhugh, and extend on down to the measurement in 1900, when there were two measurements made, one by Mr. Wright, and one by Mr Culver; I show each in the proper place, but I have connected the line with the smaller measurement, the larger measurement being placed above that in figures. The other measurements are also taken from Exhibit 32 of the plaintiffs' and show the fluctuation of the water throughout the years up to 1900.

Beginning with 1888, the water rises up to the high measurement of 1890; the high peak from 1890 to 1892, is unquestionably due to the developments of the tunneling on the east side, when the I tunnel, and other cuts and ditches were constructed, and I would not consider that as of any value bearing upon theconclusions to be drawn from that diagram. But from that point, beginning in 1893, or 1894, the constant decline of this water, before there was any pumping by the San Antonio Water Company, of sufficient consequence to merit attention, therefore only a very slight pumping in 1898 and 1899 of one well on 16th street, prior to the time of taking the measurements, indicates that some cause or causes were operating to diminish that water-supply and if we lay on a pointer, extending this line by a dotted green line which I am drawing, at the same rate of decline, the east side Cupa-Cupa springs and I tunnel would have been dry in 1904, from the same rate of decline which

existed prior to that time. I find by looking at the measurements that there was water in 1904 to the extent of about 14 inches, showing that the decline from 1900 to 1904, was not as rapid as it had been prior to that time, in spite of the fact that there was pumping and continued dry years.

Mr McKinley: We offer in evidence the diagram.

Said diagram is admitted in evidence and marked

DEFENDANTS' EXHIBIT 112.

Q You have testified in regard to the supply and the amounts withdrawn: State whether in your opinion further abstractions can be made on the lands of plaintiffs, without overpumping the supply?

A Yes, sir; in my opinion the plaintiffs could make abstractions from their land, which would still be within the supply to this formation, as there is now a surplus passing out of the reservoir, in addition to that is being drawn by various parties developing water in the basin.

Q How near to the surface is the water-plane in the lands on the east side alleged to belong to the plaintiffs in this case, particularly the plaintiffs the Cucamonga Land and Irrigation Company, and the Cucamonga Vineyard Company?

A Well, at one point in the lands of the Cucamonga Land and Irrigation Company, the water-plane is at the surface, not only one point, but a large part of its holdings,- being where the Cucamonga Springs are rising, and where the F tunnel is located, at the mouth of the F tunnel, and in the China Cienega, lying to the west of that point, and as you go east the water-plane descends, so that in the Vineyard

Company's tract, lying within the portion marked Alluvium, East Side, on Exhibit P, the water plane is very near the surface; being from a few feet to possibly down as low as 50 feet at the deepest place. Below the dike where the water is shut off by the ancient deposit - -

Mr Waters: We object to this on the ground that it is not apparent whether the witness is stating mere opinions or is stating a fact; ofcourse we can understand him, that he is stating facts when he says that the water-plane is there at the surface where he saw it; but, I think we had better draw a line, so as to know whether he is stating facts and when his opinions.

The Court: Q Is that an opinion?

A It is based on facts.

Mr Waters: I am not talking about whether it is based on facts; I am talking about what you are testifying to.

A I am talking about measurements of wells in that tract and tunnels, which are in the record in this case already.

Mr Haskell: He says the water is shut off by the ancient formation; does he state that as a fact or an opinion?

Mr McKinley: We will consent that that be stricken out.

The Court: From and including the part of the answer, "Below the dike"- will be stricken out.

Mr Waters: I think everything beneath the surface should be struck out; I move to strike out that part of the answer of the witness where he ceases to speak about that which he can see, and wherein he goes into the realm of speculation as to what is beneath the surface.

The Court, Q Are you basing that upon the evidence in

the case?

A According to my own knowledge and experience in the vicinity, and according to the measurements in tunnels and wells.

Q If you will state in these matters, when you are giving an opinion, and when you are testifying as to matters of your own knowledge - -

A I understood I was called to give opinions as well as facts.

Mr Waters: We want to know which is which.

A I am perfectly willing to state which is opinion and which is fact; it has usually been customary to bring that out on cross examination.

The Court: That part of the answer beginning with "being from a few feet" - will be stricken out.

Mr McKinley, Q What is your opinion as to the depth of the waterplane at these other points other than those you have mentioned?

A My opinion is that in all of the portion of the land of the Cucamonga Vineyard Company, which lies within the portion marked Red Alluvium on Defendants' Exhibit F. the waterplane is near the surface, and on the east line of that part of the land where the lower Star tunnel comes out, I have measurements showing that the waterplane is practically at the surface; after you pass south of the portion marked Red Alluvium, East Side, on this map, my opinion is that the water-plane is deep, owing to the fact that the recent formation begins and the ancient formation ends, so that no water is supplied to the lower part except by

circuitous percolation around the dike formed by the Red Alluvium. The map, defendants' Exhibit F. in my opinion, divides the lands where the waters are near the surface, and where they are not, in the lands of the Cucamonga Vineyard Company.

Q What do you mean by near the surface?

A As testified to, that they are either at the surface or xxxxxxxx in my opinion a few feet below

Q Have you made estimates of the cost of pumping water at different depths?

A I have.

Q What in your opinion would be the cost of pumping water in that locality, on the land of the plaintiffs, the Cucamonga Vineyard Company, and the Cucamonga Land and Irrigation Company?

Mr Waters: Objected to as irrelevant, immaterial and incompetent, in that the law does not recognize the right for any person or corporation to take away a living stream from any person, and render an equivalent or an approach to an equivalent, in the way of a pumping scheme.

The Court: The objection is overruled.

Mr Waters: Exception.

A I have made an estimate of pumping 50 inches of water - no, I don't mean that - I made an estimate for pumping water 50 feet high, for the purpose of irrigating land, and my result in that locality is that with an irrigation head of 50 inches for ten acres, the cost of lifting the water 50 feet high would be 33 cents per irrigation to the ten acres. per acre, or if you take the whole ten acres, $3.30; or if

you apply six irrigations, which would be about the average for oranges, the cost per acre would be $4.98 per year, lifting the water 50 feet high. Now, lifting it 25 feet, would be a little more than half of that cost; the fixed charges would remain somewhat the same,- that is, I mean the charges for labor and operation; and you can allow slightly less, if the water is lifted one hundred feet for irrigation, than double.

Q Slightly less than double?

A I mean slightly less than double if the water is lifted one hundred feet.

Mr Waters: That is objected to- -

Mr McKinley: What is objected to?

Mr Waters: The last answer and I move to strike it out on the ground that it is incompetent, irrelevant and inadmissible, in that even if a pumping scheme is allowed to be substituted for a flowing stream or gravity stream, that the factors given by the witness do not include the investment for a pumping plant, nor the expense for a well, nor other elements that go to the matter of this cost.

The Court: The motion is denied.

Mr Waters: Exception.

Q Have you examined Defendants' Exhibit A, which was introduced during Mr Trask's testimony?

A I have.

Q State what opinions with reference to the matters shown thereby you deduce from it?

A This is a representation of the flow of water at weir number 8, compared with rainfall records in the case, being

Exhibit A of the defendants, and designates the rainfall record by months, beginning with the year 1904, and ending with the year 1908; and this exhibit shows the fluctuation of the Cucamonga Springs, which are measured over weir 8, with the rainfall, and also the annual summer fluctuation each year, as has been revealed by all the measurements in the case; and in detail I might state that with the year 1904 the light rainfall caused the stream the following summer to descend to a lower point - -

Mr Waters: We think this is unnecessarily cumbering and building up the record in this case for no good purpose; the diagram has already been explained by the witness, and we object to it.

The Court: It is not necessary to take up any time describing that; that has been described.

Mr Waters: Let him give an opinion if he has gone one, - or two.

A My opinion, based on the diagram, is that the fluctuation of the flow from the Cucamonga Springs, is in accord with the rainfall, being at a distance back, as it takes a certain amount of time for the rainfall to have its full effect; and that the dry months in the summer show their effect on the Cucamonga Springs by evaporation which occurs from the ground and the channels tributary to the springs, and that no other cause has operated to cause the fluctuations of the Cucamonga Springs, except the rainfall.

Q Why do you draw that conclusion from that diagram?

A Because it shows a fluctuation up and down according to the rainfall, of the quantity of water flowing from the

springs; and the year 1906 showing the cumulative effect of three previous years of better years than those which preceded 1904.

Q. Have you examined Defendants' Exhibit L, (Plaintiffs' Exhibit 1), - -

The Court, Q. Do you mean to say that it takes about three years for the effect of rainfall to make itself manifest at the Cucamonga Springs?

A. I would not say that it takes that long to make itself manifest, but that the full effect, probably, is not felt in less than three years, possibly longer; a portion of the rainfall occurring near is probably felt sooner.

Q. Have you examined Defendant's Exhibit 1?

A. I have.

Q. What opinion have you derived from that exhibit, as to the effect of the rainfall upon the elevation of the wells and water-plane?

A. From that exhibit I formed the opinion that the water-plane in the wells is lowered by a lack of rainfall, and rises from an increase of rainfall.

Mr Stevens, Q. Wouldn't you know that without the diagram?

A. I thought everybody knew it, but it has been denied in this case so I had to make diagrams to prove it.

The fluctuation of the lower line, which represents well number 3, may be taken as typical line of the reservoir or gravel basin north of base line.

Mr McKinley, Q. Have you examined Exhibit M?

A. Yes, sir.

Q. State what your opinion is as to the matters shown there,

with reference to the water level and the rainfall record?

A The rainfall record plotted by this exhibit, coincides with the fluctuations of the level in Hellman well number 2, as designated by the plaintiffs, being the west well in the Y tunnel, and shows the decline each summer after the season's rainfall, becoming less marked as we proceed into the wetter seasons, so that the decline during 1906 is less than it was in 1905, and in 1905 less than the previous years, et cetera; and it shows the rise on the advent of rainfall each year, beginning with the year 1904, continuing in 1905, and dropping after the rainy season, and rising again in 1906, and dropping after the rainy season, z and again rising in 1906-1907, up to the end of the diagram, this being made from the rain fall records at the Harwood guage, and the measurements introduced by plaintiffs, in exhibit number 3.

Q Taking the three exhibits together, what is your opinion as to the effect of pumping the 16th street wells, upon the waters of the east side?

The Court: You refer to the last three exhibits mentioned?

Mr McKinley: Yes, sir.

A My opinion is that the 16th street wells have had no effect on Hellman well number 2, or on the discharge of Cucamonga Springs, for the following reasons: These three exhibits, which delineate the three matters to which I have referred, each one shows that all of the three matters shown on the exhibits fluctuate with the rainfall; and the plaintiffs' experts in comparing the well number 3, with these elevations in Hellman well number 2, and the

flow of Cucamonga Springs, have merely made use of the rule that two things which vary according to the same law, or from the same cause, will vary alike, no matter what they be; and they had might as well have gone to Santa Barbara County or San Diego County, and taken a well - - our waters: I think now the witness is certainly going beyond the proper limit - -

The Court: I think you are going beyond.

A Well, it is necessary to explain - -

Mr McKinley: Just explain your theory.

A My theory is that if you find any three things which are all dependent on one natural cause, you can make out a prima facie case, by taking any two of those things and comparing them with each other, as the plaintiffs' experts did in this case, taking three things which all varied according to the rainfall, and comparing well number 3, with their springs and their Hellman well number 2, from which they reasoned back that the elevation in well number 3 was the cause of the fluctuation in the others, while as a matter of fact they were all dependent on one cause, namely, the rainfall.

Q Have you any further comment to make on Exhibit I? That is the topographic map.

A I believe that has been fully explained.

Q Referring to defendant's Exhibit K, have you any opinion based upon that, with reference to the sympathy between the different wells and developments and springs?

A I have.

Q Proceed and explain it?

Mr Waters: We object to that on the ground that defendant's Exhibit K is founded professedly on data not testified to in the case, and depicts merely imaginary conditions, and there is an assumption in Exhibit K, that the strata penetrated by the 16th street wells are depicted there, or several of them, and the fact is that those logs are not in evidence, and as I recall it Mr Frank stated that he drew the stratification, or picture of that stratification on that exhibit as a surmise.

Mr McKinley, Q Leave out of consideration the question as to the logs of the wells, referring only to the waterplane as shown on Exhibit S of the defendants, showing the water plane at various times.

A My opinion based upon the data shown on that exhibit is that the waterplane is recovering rapidly its former elevation; also that the exhibit delineates plainly the separation of the water plane in the 16th street wells, and the water plane of the wells in the old alluvium to the right hand side of the exhibit, such as Well L, of the Lone Star tunnel, by showing a break in the formation at that point. Further that the exhibit in my opinion does not show the trend of percolating water, as it is drawn on an irregular line along the foot of the mountains, not parallel with the mountain range, but at an angle with the mountain range, and by changing this angle, as may be illustrated on Exhibit P, any result desired might be obtained,- any dip desired; if this were to show the dip of the waterplane it would have to be laid parallel to the mountain range, or parallel to the uplift secondarily of the ancient formation, instead of

being, as is shown on Exhibit P, where the wells are located, laid at an angleto the formations; and the correct dip of the waterplane is shown by my hydrographic contour map, which I presented this morning.

Q State whether you are familiar with well number 1 or not or with the log?

A I am familiar with well number 1, which is known as well number 3 on this exhibit, known as well number 1 when bored, as I was then employed by the San Antonio Water Company as consulting engineer, and frequently visited that well while it was being drilled, and saw the material which was removed from it, and measured the water-level in it at various times, to ascertain whether there was a rise of water at any time above the surface water; the other wells on the exhibit I am not familiar with.

Q Will you examine Intervenor's Exhibit number 1, and state what opinions youxdeduce from it?

A Intervenor's Exhibit number 1 is drawn much the same as Exhibit K of the defendants, except that it covers a large number of other wells lying further south, and is not an index to the direction in which water will travel, as will be seen by reference to Exhibit P, that the lines are not laid out parallel with the mountain range, or parallel with the strike of the ancient alluvium, but at an angle to these deposits, and by running the line on an angle to the southeasterly, a fallxof the waterplane can be made as the delineator may desire, and the only and final test of the water plane and of the direction in which water would travel would be by laying down hydrographic contours, connecting

the levels of the various wells.

Q Will you examine Intervenor's Exhibit number 2, and state what comment you have to make upon it, with reference to the showing that it makes?

A Intervenors Exhibit Number 2, shows portions of the hydrographic controur along the district of the Red Hills, and if these hydrographic contours are relied on, which are shown in the heavy lines, and marked with the elevations, the water from the 16th street wells would percolate to the southwest, as is shown by the hydrographic contours which I introduced this morning, and taken in connection with exhibit number 1 of the intervenors, it would show that in the old formation on the east side, the water percolate to the southeast, in the opposite direction from that which it travels in the recent formation to the west side.

Q What is indicated by the change in water grade there?

A The changes in water grade there are due to the contact between the recent alluvium, or late quaternary, with the early; the water in the recent formation is only surface water, which travels rapidly through the coarse material, while in the ancient formation it is artesian water traveling under pressure, and against marked resistance in the clay and silt formation which surrounds all of the veins carrying the water.

Q Referring to plaintiff's Exhibit 34, will you state whether you have examined this diagram, and what it indicates with reference to the causes of the depletion of plaintiffs' springs and tunnels?

A I have examined this diagram, and note what it indicates

as to the causes of the depletion of the Cucamonga Springs and Y tunnel, and other east side sources.

Q Well, state what is your opinion?

The Court, Q Does that show the combined measurement of the springs and Y tunnel?

A That gives the combined measurement of the Y tunnel and Cucamonga Springs, beginning with the year 1885, when the first measurement shown on Exhibit 32 of the plaintiffs is given, this being prepared by the plaintiffs, showing the flow on the east side of the Y tunnel and the Cucamonga Springs, and indicates with the rainfall and development of the Y tunnel the water of the east side increased up 1890, when in July it was 505.88 inches; from that point it began to decline, and in my opinion up to 1894, when the measurement of 356.29 inches was made, that decline was due to the development, draining the formation in that neighborhood; from that point a decline has continued each year, from 1894 down to the year 1905, and the rate of decline, if continued, would have really caused the developments on the east side to be dry in 1905; but there was a small amount of water there that summer, so that the causes of drying up are plainly shown to be, in my opinion I should say, the causes of the drying up are the developments which were made on the east side in those early years, on the Lone Star tract and others, aided by the greater diversions along the foot of the mountains by others, the denudation of the watershed by burning over the timber, the cutting and clearing of the brush and growth in the foothills, and other causes which are not related to any of the developments of the defen-

dent, the San Antonio Water Company, as if the decline were allowed to continue it would have left the springs dry at that time, in spite of the fact that there was no pumping of any consequence, prior to the year 1900, while the decline before that time was more rapid than it has been since that time; there is a note on this exhibit, August '96 commenced pumping 16th street well, but that would refer only to the small amount of pumping done by Franklin and Stark, as testified to in this case, of something like 35 inches or 75 inches, at times; nothing in '97; and they began pumping in '98 or '99, 30 inches or thereabouts; so that if even all that pumped water, which came out only six months each year, were taken into consideration, it could not contribute in any material quantity to the decline, and therefore the statement that they commenced pumping the 16th street well in August, 1896 is very misleading, as the quantity of water pumped was so small, that even if it was in contact with the other supply it could not have affected it; but that decline is due to other causes; and the rise is due to the increased rainfall of the last few years.

Q Have you examined plaintiff's Exhibit 75, showing measurements in ~~all number 8~~ weir number 8?

A I have.

Q State what your opinion is as to the matters shown there and the bearing upon the disappearance of the waters from plaintiffs' lands?

A ~~Referring~~ This exhibit 75 purports to be made from measurements and data given in plaintiffs' Exhibit number 3, and before analyzing it I wish to compare some features of

the two exhibits:

On this exhibit we find marked at March 31, 1934, that the San Antonio Water Company is pumping Maskell well number 2, while Exhibit number 3, on which the diagram is based, shows tat the San Antonio Water Company was not pumping any of its wells on that date, and that the decline, whatever was causing it, must have been due to some other cause; nor was there any pumping, according to exhibit 3, until the 6th of July that year.

Mr Britt: Some exhibit shows that it was pumping before that time in 1934.

A It shows well 14 was pumping, and nothing else,- was pumping about the 16th of February, and closed before the 31st of March. I can't find any evidence that there was any other pumping; on the 6th of July, when it is stated that the San Antonio Water Company began pumping well number 6, that exhibit 3 shows that to be a fact, but not the statement in regard to the Maskell well number 2; and this exhibit is not even based on coincidence, because the decline anticipated any pumping from the wells, and if the pumping were the cause, and the decline were the effect, then on the theory of coincidence you could not form an opinion that there is any relation between well 6 and the pumping.

Mr Waters: We object to this, and move to strike out the testimony of the witness in reference to this diagram, on the ground that it is irrelevant, immaterial and incompetent; if these claimed discrepancies are observable from the testimony then that is a matter for the counsel and not for the witness; and I move to strike that part of it out.

Mr McKinley: We consent that that be stricken out.

Q State your opinion, without stating the defects in the diagram.

A My opinion is that the exhibit does not show any relation between the pumping of the San Antonio Water Company and the decline of flow at weir number 8; but that it is an attempt to build up on partial coincidence a theory of that kind which is not sustained by the facts.

Mr Stevens: I move to strike out the last statement of the witness beginning with "but that it is an attempt" -

Mr McKinley: I have no objection to its going out.

Q Now, you may give your opinion.

A Well by striking out that last , it was given by me, that the exhibit was based on coincidence, and that the coincidences do not coincide, and therefore the theory built on it is in my judgment untenable.

Q Will you explain your reasons for believing that that exhibit does not demonstrate any connection between the two supplies?

A My reason is, that bearing in mind the facts on exhibit 3, on which it is based, and also the other facts which corroborate exhibit 3 in that regard -

Q That is the other facts in evidence?

A Yes, sir, which I have examined with a great amount of labor in this case, looking over the record - that the coincidences are not complete, and that the theory is not warranted by the facts in the transcript in this case.

Q Have you examined plaintiffs' Exhibit 36?

A I have examined it.

Q State your opinion with regard to the matters shown on that exhibit, as to whether they show the pumping of the San Antonio Water Company affected the water flowing in the cement shaft, in tunnel number 2?

A By referring to the exhibit we find that there are notations in ink above the diagrammatic line on the exhibit, purporting to show the commencing of pumping, without stating where or at what wells, and later there are pencil notations which were placed on the exhibit by one of the witnesses for plaintiff: February 16, stopped pumping number 14; February 27, stopped pumping number 7 and 8; and on May 19, commenced pumping wells.

By consulting exhibit number 3, as well as the testimony of Mr Leeke and others in the case, the well number 14 in the head of the Eadie tunnel was pumped during 1903 from about October, that year, until the 16th of February, 1904, and that the words commenced pumpied are not relevant to the exhibit - .-

Mr Waters: I move to strike out all of the statement of the witness wherein he states that the exhibit is not in accordance with the other evidence in the case; that is all argument.

The Court: The motion is granted; that is a matter to be pointed out by counsel rather than by the witnesses.

Q With reference to the matters shown on the diagram, assuming that they are true, have you any opinion as to that diagram?

A Assuming that the matters are true the diagram fails to carry out the coincidences between the pumping and the

rise and fall of water in the Sadie tunnel; and as it is on the theory of coincidence that the diagram is drawn if that coincidence fails in any one time, at any one period it destroys the entire theory; because if there is a law governing the two things the law must work uniformly at all times, and could not work at one time in one way, and at another time in a different manner.

Q Explain the failure of coincidences.

A Taking May 19, 1904, it says , commenced pumping wells; and the decline of the water in the Sadie tunnel had antedated that point; now if that were attributable to the beginning of pumping on May 19, the point of beginning of the decline would have to be after the beginning of pumping and not before; and if all the measurements which Mr Reed made- there is one of Mr Reed's measurements - were shown, it would still accentuate this. And at the stopping of the pumping in January, 1906, the rise of the water had already commenced before the pump stopped; that is further shown by exhibit 3 - -

Q Don't go outside of this exhibit.

A Well, on this exhibit it shows the same thing: that the rise of the water also anticipated the stopping of the pump; if it were the effect it would have followed it instead of preceding it.

Q Have you examined Plaintiffs' Exhibit Number 36?

A I have.

Q What is your opinion as to that?

A The exhibit purports to show the pumping operations of the San Antonio Water Company, and the rise and fall of

water in artesian well number 2, and Hellman well number 2; now if I am not permitted to point out where there are discrepancies I will have to confine myself to the exhibit.

Q Yes, confine yourself to the exhibit.

A But even taking the exhibit itself, and referring to the place, San Antonio Water Company pump a Haskell well number 2, the rise of Hellman well number 2 has preceded that fact, and when this Haskell well number 2 was pumped , after that Hellman well number 2 still continued to rise; if the pumping of the Haskell well were the cause and the Hellman well falling were the effect of that, the reverse would have to occurr at this time. And when we come to the next summer, when San Antonio Water Company commenced pumping wells 3, and so forth, as marked, about the middle of July, previous to that time having pumped only Haskell well number 2, as per the exhibit, and the waterplane having risen and then commenced to fall before that,- after that the fall was less than it was before, which would seem to show if it showed anything, that the wells when pumped would help the elevation of that well. And as we progress we find irregularities of that character, which destroy the ~~the~~ theory of coincidence upon which this exhibit is made, as a single fluctuation from the law would merely demonstrate the other agreements to be coincidences which are not assignable to the law, but to accidents or other cause.

Q What in your opinion accounts for the break there?

A My opinion of that is that this Hellman well number 2 is situated in the Y tunnel, which is connected with the ancient formation, or alluvium, on the east side, and that some well

or pumping plant in the same formation on the east side, caused that drop; if we were in possession of all the facts relating to the times when all of the wells on the east side were operated, this might be made much plainer; but as this case only includes the pumping operations of one of the ~~plaintiffs~~ parties in the basin, the San Antonio Water Company and does not include all the others which are near and in the same formation as this well, it will be impossible for me to point out the precise thing which did cause that drop; it was not due to the San Antonio Water Company, as they were not then pumping, and could not be due to any natural cause, being too great to be due to any natural cause, being something like 7 or 8 feet in that well, all very suddenly.

Q The plaintiffs have introduced here a tracing, which Mr Trask had, showing the cienegas of the east and west side: You saw the map that Mr Trask had here, the map from the Mcpherson case?

A I did.

Q Did you have anything to do with the preparation of that map?

A I did.

Q What did you have to do with it?

A The map was drawn in my office under my direction, from data which Mr Trask furnished me, principally, and some of the data was furnished by Mr Stowell on three or four maps which he gave me.

Q With reference to the condition of the cienegas, at the time that map was made, are you familiar with it?

A I am.

Q What were the cienegas shown upon the map? Were they existing cienegas, or what was the matter shown by the map, with reference to cienegas?

A They were copied from a map furnished by Mr Stowell, which had been made from early surveys, about the beginning of the year 1890 or thereabouts, and did not purport to show the cienegas as they existed in 1900 when the map was made.

Q Will you describe the condition of the cienegas on the east and west side at that time?

A In 1900 the cienegas were all very much diminished; the China cienega in this exhibit 81, which is marked where the word east is written, was almost dry, and all of the cienegas shown on that map, on the east side, were reduced to a small area; on the west side, the west cienega written on the map had been ditched with several ditches, and the measurements of water which I gave here the other day, very small quantities, were coming from those developments; and the west cienega was practically dry at that time and not as shown on this map; this map was really made to show the original condition of the cienegas before any development except the Y tunnel had been made.

Q Have you examined plaintiffs' Exhibit 39?

A Yes.

Q State what opinions you have deduced from it with reference to the matters in issue here?

A The opinion deduced from that is that the two formations the one shown as summit of Red Hill on the right hand side, and the other formation beginning at the point where the two broken lines showing east and west side converge, that

being the ancient formation, and the other the basin formation above, are shown by this exhibit to be two distinct formations, being nonconformable, as the Red Hill has appeared in the form of an uplift, which has gradually eroded and abraded, until it has reached the present flat-top condition; whereas, the other formation lies against it nonconformably, being the result of recent wash deposited against that ancient alluvium. Again, I form the opinion that the deposit both on the east and west side channels, over the cut through the ancient alluvium, is very slight, as the grade of the upper basin projected through coincides practically with the dotted line showing channels through the ancient alluvium, and were the cuts deep through the Red Hill the upper basin would have assumed a different grade, instead of building up to that point; which shows the point of control of the basin has been the more ancient formation, which has permitted the basin to build up to that point; and the emergence of the water as marked Cienegas, 1899, on the face of the Red Hill, causes me to have the opinion that these waters are coming from the ancient formation, since if they were not, they would come on a grade line with the recent formation, and appear at a much lower point than the point marked on this exhibit. The exhibit is in harmony with the geological explanation which I have given in the case and I don't think anything more is needed to elaborate it.

-o-

Here the Court takes a recess until tomorrow, April 6, 1909, at ten o'clock a.m.

-o-

J. W. MC KINLEY

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co et al Plaintiff vs. San Antonio Water Co et al Defendant	Tuesday April 6 '09 Vol 46

Index

F. C. Finkle. Cross Examn 4116
4092

I. BENJAMIN, Official Reporter

Tuesday, April 6, 1909. Forty-Sixth Day.

F. E. FINKLE.

Direct Examination Resumed:

By Mr. McKinley: Q Will you state whether you have examined Exhibit O and have you formed an opinion as to the relationship of the pumping of well no. 9 to the discharge of the Y Tunnel and of the springs?

A I have.

Q Will you state your opinion in regard to that?

A My opinion is that well no. 9 of the Cucamonga Water Company which is at the head of the Lone Star Tunnel is on the same channel which supplies the Y Tunnel and Cucamonga Springs. By laying your straightedge or rule on exhibit P and passing through that point from the mouth of Deer Canyon the line would pass through the head of the Lone Star Tunnel and the Y Tunnel and Cucamonga Springs.

The Court: Which well do you speak of as no. 9?

A The plaintiffs well no. 9. It is the well at the head of the Lone Star Tunnel. And when the formation was laid down from Deer Canyon, pointing in that direction, unquestionably a channel was formed which supplies those two sources, and the exhibit O which is based on plaintiffs' exhibit 78 is merely a graphical representation of that, and shows that as the pumping of this well at the head of the Lone Star Tunnel commenced there was a drop at once in the discharge of the Y tunnel and in the Cucamonga Springs, while previously there had been an increase in those sources. The drop was more rapid in the Y Tunnel, which was nearer

the well than the Cucamonga Springs. And exhibit 76 from which it is made shows that the San Antonio Water Company did not commence pumping any wells that year until over a month after the beginning of this pumping and the beginning of this drop in the two water sources. Therefore, the drop could not be ascribed to any of the wells of the San Antonio Company.

But by taking exhibit O in connection with exhibit P and noting the direction of the early flow when the ancient alluvium was deposited from Deer Canyon, the matter is easily explainable on the theory which I have stated.

Q Have you examined Plaintiffs ' Exhibit number 60?

A I have.

Q What opinion do you deduce from plaintiff's Exhibit number 60, and the data shown thereby as to the effect of the pumping of the 16th street wells on the west side or Eadie tunnel?

A The opinion I deduce from that is as follows: On February 16, stopped pumping number 14, which is the well at the head of the Eadie tunnel; that ofcourse showed a drop in the Eadie tunnel by the amount which was pumped; then on February 27 ceased pumping wells above Base Line, which is nine days later; but from the time well number 14 stopped pumping, up to the 27th there is a rise in the water of the Eadie tunnel, in spite of this pumping on Base Line; after that pumping ceased the line continues irregular, but has a general drop to May 19 from the highest point on the profile, sometime in April; and when the pumping on the 19th started, there was no change until the warm season, after

the middle of June, came, when ofcourse the summer drop, which occurs annually, occurred. Then following out this profile , we find that the pumping ceased on January 9th, which agrees with the testimony also; but that there had already been a rise in the well by the profile before that, so that the rise if due to the stopping of the pumping, had anticipated the stopping of the pumping. Then we find that by continuing to August 17, 1905, that the pumping is stated on this exhibit as again resuming; the drop, however, in the Eadie tunnel had commenced sometime before that in the latter part of July; and if the pumping were the cause we would have to assume that the effect on the tunnel would anticipate the starting of the pumps by some considerable time. That is the end of the profile, because there is a notation to the effect that no more measurements were taken because the bulkhead was put in; that, however, is not correct, because the bulkhead was not put in until 1907. The conclusion I draw from this exhibit is that there is not a coincidence between the fluctuations of the Eadie tunnel, and the pumping of the 16th street wells north of Base Line, as in each case the rise or decline either precedes or follows the stopping and starting of the pump, and does not coincide with it. It is evident that this was made for the purpose of showing that there was a coincidence, but as I have explained in detail the coincidence does not occur; my opinion being that if the pumping were the cause the rise or decline could not antedate it, but would follow it, or at least be coincident with it; this diagram really shows, in my opinion, that the

pumping on 16th Street had no effect on the Eadie tunnel.

Q What intermingling, if any, in your opinion, is there between the waters from the two formations on the west side?

A At the present time the intermingling occurs only where the water is wasting from the gravel reservoir north of Base Line through the outlet to the southwest, at the point where the Eadie tunnel leaves the old formation and enters the recent formation, and to that extent it is probable that the Eadie tunnel intercepts a portion of the water which is on its way to the outlet, having passed down to a point where the Eadie tunnel penetrates into the recent formation; this I find agrees with the authorities, such as Mr Mendenhall, in his paper 219, where he states that there is an intermingling - -

Mr Britt: I object to what Mr Mendenhall states, and ask that it be stricken out.

The Court: Stricken out.

Q What are your reasons for the opinion that that is the only intermingling?

A My reasons for that are: First, the fact that I saw the contact between the two formations, and the examinations which I have made of the wells and the Eadie tunnel; and secondly, the authorities I have consulted -

Q Well, only from anything in this case?

A And further from my inspection of the ground to determine the geology, and also the movement of underground water from the hydrographic contour of the waterplane at that point.

Q You spoke of the present: What intermingling, if any has there been in the past, in your opinion, of the waters of the formation of the west side?

A In early days, when I first examined this locality, in 1899, there were cienegas caused by the outflow of water from the ancient formation on the west side of the Red Hill; there was one cienega known as the Picnic Cienega, on the recent deposit; undoubtedly the water which I observed at the surface there on the Picnic Cienega was water from the ancient formation which escaped through the apertures, and in passing to the surface must have mingled to that extent with the water in the recent formation, at the same point I have described, where this water is on its way to the outlet, or near the outlet of the gravel basin; but there was not, nor could there be, any intermingling of the recent water by entering the strata of the old formation at that point, owing to the pressure in the old strata and the head under which the water in these old strata was travelling, as well as escaping at that place.

Q What intermingling, if any, in your opinion, occurs of the waters of the different formations on the east side?

A On the east side there never was and is not now any permanent intermingling; the channel on the east side is covered with a very shallow deposit of the recent formation, from a point somewhere below the Rubio well, down to the end of the Red Hills; but after heavy rainfall and freshets, when this layer of recent gravel and boulders has been saturated with water flowing in the flood channel, it would require some days or weeksto drain out this deposit, and

during that period I believe that there was an intermingling to the extent ~~of this~~ gravel channel while draining out would mingle its supply during the latter part of the rainy season, or early part of the rainy season, with the permanent waters which were rising from the cienegas in the ancient formation.

Q There was testimony given here by two witnesses, about the appearance and disappearance of water, at the time of pumping the Rubio well: State how quick the operation of the pumping of that well could be, on water the distance they describe? You are familiar with the testimony I believe?

A Yes, sir; I am familiar with that testimony; it was stated that this was in the fall of 1896; if it were the underground waters themselves, the time of interference by pumping a well at that distance from the spring referred to, would have been a long time, days and weeks; but by referring to the San Bernardino rainfall table, on page 2493 of the transcript in this case, we find that that Fall there were early rains, 2.1 inches in October; .98 of an inch in November, and 1.09 inches in December; also by referring to the rainfall record of Mr Harwood, on page 2487 of the transcript, we find that that gives 3.32 inches for October; .93 in November, and 1.66 in December, during the time to which this testimony relates. Therefore in my opinion this was a phenomenon caused by the saturation of the recent boulders and gravel by this flood flow from these heavy rains; and if Mr Rubio started to pump his well, he would

ofcourse divert the small surface stream that was running through the gravel, and stop the stream at the lower point, at the point stated, in the time stated, which would be about the time it would take a stream to flow that far. Since this testimony was given I was over the ground with Mr. Trask, and examined into the matter, and came to the conclusion that this is the only explanation of the testimony.

Q What intermingling if any has occurred in the past in the waters of the East side? You spoke of the present?

A As to the past, I have never known of any other, nor has any been called to my attention, than the one which is stated occurs now, namely: that rainfall causing a flood discharge down the east channel would saturate the thin layer of recent gravels, so that they might for a brief period contribute to the flow from the cienegas, while draining out; and my reason for stating that isthat the evidence of erosion on the east side in that channel does not exist to any depth; that channel in the ancient formation is so shallow that the water above it is never raised high enough to flow over from the gravel reservoir, the westerly outlet being lower, and sufficient to drain all the supply from this gravel basin above the Red Hill dike.

Q What is your opinion as to the intermingling of the waters of the east side in the old formation, and the waters of the west side, as to their relation and sympathy, if any?

A My opinion is that there is no intermingling.

Q Give the reasons for that opinion?

A I will explain that by referring to Defendants' Exhibit P.

If we lay our ruler from Cucamonga Canyon to the west side it would indicate the manner in which the ducts or channels conveying water were deposited; these are all passing in such a way as not to mingle with the east side; you cannot draw any line from the mouth of Cucamonga Canyon, which would pass through the east side and the west side at the same time, and therefore reasoning from the manner in which the ancient alluvium was deposited, each and every channel when the stream was flowing on the west side, would be separate and distinct from any flowing on the east side; and reasoning the same way on the east side, by starting at the mouth of that canyon, ~~and~~ any duct which strikes the east side and supplies water to it through the ancient alluvium, would be separated and distinct, and could never cross any channel which goes to the west side.

Now if we take the San Antonio Canyon which in a limited way supplies the west side, we can draw no line which would pass through the Cucamonga Springs and Y Tunnel and the Eady Tunnel developments on the west side. And if any channels were deposited from the San Antonio Canyon, which it is probable that there were, they could not have been laid down so as to pass through both of those points, and therefore you can't expect that there would be an intermingling ~~x in the dependent~~ or dependence of one on the other.

Now if you go to Deer Canyon and do the same thing, you cannot lay any channel on this map from the mouth of Deer Canyon, by taking the swing of the floods, which would pass through the Y Tunnel development, Cucamonga Springs development, and Eady Tunnel developments. Therefore, the same

rule applies. And when you come to the Eady Tunnel the same thing applies in a stronger degree than either of the others. So by analysis of the topography along the foot hills, and a reference to the course taken by the streams flowing in the old quarternary deposits were laid down, it is impossible to conceive of a case where the same channel would feed both the west and the east side.

Q What is your opinion as to a possible connection through the Red Hill, by fracture or otherwise?

A The opinion I hold on that subject is that the movement of waters underground is always parallel to and along the line of the course followed by streams which laid down the deposit through which the water is moving, and not transversely and at right angles to the deposit. And that is based on the law of hydraulics, that water will take its easiest course or course of least resistance, as contradistinguished from the greatest and most difficult course. And in this formation the water supplies following the course taken by the streams when the material was deposited, creates an easier course for it to follow, and therefore it cannot be assumed that the water would pass transversely to the stratification and communicate from the west to the east side.

Q What is the stratification, in your opinion, between the east and west side?

A It consists of these ancient clays and alluviums laid down in the early period, interlaced with stringers or ducts of a course gravel brought down by the heavier floods in that period, but all pointing southerly and not

easterly and westerly, as they were laid down from the same mountain range which now exists, only at a different period, and therefore would point in a different direction from which these waters would take in flowing.

Q What is your opinion as to their being derived from the same source of supply in the mountains?

A At the foot hills the two waters are unquestionably from the same watershed and the same rainfall and the same general source of supply that is discharged on to the recent gravels which overlie the older. And at that place the water is not under pressure but is free percolating water, and taking the line of least resistance, travels down and southerly.

And if the ancient alluvium were wholly emptied of its flow down at the lower point, it would not enable it to take in any more water from the recent alluvium than it now takes in. Also, if the recent alluvium down near Base Line is wholly emptied of all its water, it would not aid it in depriving the ancient alluvium of any water which it takes in as long as there is still water at the point where the two are in contact. But this percolating water, without being under pressure in the old alluvium, cannot be defined by measurement as we have not wells to explore it, but it may extend from a half a mile to a mile.

Q What is there in your opinion to show that that does not extend down to the Loch Street wells?

A The free water conditions?

Q Yes.

A The artesian pressure ~~and~~ the ancient alluvium shows that at a point sufficiently high in this basin to give the hydraulic head under which the wells are discharging, the water becomes confined in these ducts in the ancient formation, and from that point travels under pressure till its exit in the wells or cienegas in the old formation, and wholly separated from the waters in the recent gravels overlaying that point.

Q What in your opinion is the condition of those ducts and strata as to giving free movement to the water so that the pressure would be sufficient to lift it to the height that the water comes into those ducts?

A These ducts are the old channels of gravel laid down through the fine silts, and while the friction is considerable in these channels, the higher elevation of the ducts above, where they first begin to accumulate pressure, is such that in spite of this friction the head is sufficient to discharge the water as naturally rising water from the cienega or as flowing wells at the Red Hill. The ducts are not as open as a pipe line, but they may be likened to a pipe line filled with gravel or a flume filled with gravel, having impervious sides around it.

Q What is your opinion as to howthose strata lay,-- lying horizontal, or uplifted, or in what way do they lie?

A Those strata are at a point where the waters are taken into them, upturned by reason of the uplift of somewhat many thousands of feet which occurred in the main mountain range at the end of the champlain period in geology, and also the secondary uplift which occurred in the same

period when the Red Hill terrane was created. That uplift created a synclinal condition between the main mountain range and the Red Hill fold, which synclinal condition is a bend, as illustrated on the geological sections in this case, and may be likened to an inverted siphon, the bend being caused by the uplift, the mountains on one side and the Red Hills on the other, and in the process of uplifting the flat layers of this ancient alluvium which are in contact with the older rock of the foothills, would be turned up and their ends raised by that local uplift of the mountain range. And in that way the recent gravels would come down and deposit on the upturned ends of the old formation so that the water passing down through the recent gravels and sinking would enter these upturned ends much in the same way as they would enter pipe lines which are laid with their ends pointing into the recent gravels at that point.

Q You have spoken of the run-off and of the saving of the floods: What proportion, in your opinion, does the flood run-off bear to the whole run-off?

A In this neighborhood I would estimate that the flood run-off which might pass Base Line would be about one-third of the total run-off inthese watersheds.

Q What is your opinion as to the existence--

Mr. Haskell: I don't think I understand that. At what point and under what conditions? Is it in the heavy rainfall, or what is meant by that?

A I am speaking of the natural conditions without any artificial spreading of the flood waters;as an average pro-

position.

Q Taken from any observations you made?

A Taken from records of many other watersheds which have been kept--

Q But not of this watershed?

A Well, watersheds like this.

Mr. McKinley: Counsel is going into general crossexamination again.

Mr. Haskell: I want to understand what he says.

The Court: Yes, I think you had better defer that and search him later on.

A If there is any ambiguity in the answer, I will state that the proportion of run-off is not based on any time or year; it is on the 38-year average.

It is about one-third of the total run-off

Q In discussing the amount of water which would be saved of the flood run-off if the water was not diverted, would be about 20 per cent. How do you reach that-- may be I am mistaken, but how do you get at the proposition?

A I did give the amount yesterday, stating that if the waters were not spread out by the San Antonio Water Company as they now are, that the channels which lead from that point to Base Line would take in about 20 per cent. of the total flood water at the foot hills. In other words, the channels would have sufficient area exposed to floods and sufficient porosity to absorb 20 per cent. of the total; and that we base on a great many measurements taken in canyons where the gravels are similar to these to determine the loss of the streams which are running

for a long time in their beds.

Q What is your opinion as to the existence of any relation or sympathy between well no. 7 of the 16th Street wells or the Haskell well no. 7?

A The Hellman well no. 2, designated by Mr. Trask as Well S, after going all over the figures testified to in the case, I am unable to form the opinion that there is any sympathy, and I believe there is no sympathy between Hellman Well No. 2 and Haskell Well No. 7.

Q What are your reasons for that opinion?

A Referring first to the tabulation which appears on page 89 of the transcript in this case, being measurements for the year 1904, and comparing well no. 7 or no. 1 Haskell well with Hellman well no. 2 or well known as Well S in that tabulation, I find that on the 12th of May 1904 a difference in level between those two wells of 2.3 feet, being that much higher in well no. 7 than in well S. The elevation of well no. 7, 1347.4; well S, 1345.1. If you subtract the two numbers you get 2.3 feet, well no. 7 being the higher.

On the 19th of May, which is the date when Well No. 8 is said to have started pumping, the difference is .5 of a foot less, and from that point until the 3rd of December the two wells were oscillating,-- sometimes the level in one would be higher than the other, and at other times lower than the other by as much as .5 at the maximum point. There was no regular harmony between the wells. Between the 18th of November, 1904, and the 3rd of December well no. 8 still being pumped, there was a rise in well

no. 7 of .2 of a foot, while at the same time there was a ~~rise~~ fall in well S of 1.1 feet. That is shown on page 90 of the Reporter's transcript, and which, in my judgment, disproves any connection between the pumping--

Mr. Britt: Q Give me those two figures.

A The rise in well 7 was .2 of a foot from November 18 to December 13 . The fall in Well S was 1.1 of a foot as shown by the elevations given on page 90 of the Reporter's transcript. Now if the pumping affected those wells, the pumping being at well 8,-- well 7 is nearer to well 8 and in the cone of depression of that well, whereas Well S is far away and would be on the outer rim of the cone of depression, and it would be inconceivable that the well nearest would rise .2 while the water furthest out would fall 1.1 feet as the result of that pumping. Then if we go to December 17, which is only two weeks later, and the pumping still in progress, the record gives both of those wells, 7 and S, as being on the same level, again showing that they do not follow any law due to pumping of well no. 8.

Q Then if we pass down another week to December 24, we find that at that date well no. 7 is .3 of a foot lower than well no. ~~7~~ S, departing in the opposite direction from that well from what it was formerly.

Then we find again on January 7 the two wells had resumed the same level, again being a greater change in well no. 7 than in well S.

Mr. Britt: How much greater?

A ~~On the table given at-- I should say in exhibit 7~~ page 91 of

the ~~defendants~~ plaintiff. You will find that from the same page of the transcript, page 91, that on the 11th of January the rise from January 7 to January 11 in well no. 7 had been 2.4 feet, whereas in well no. S it had been .8 of a foot only, which reversed the condition I referred to in the month previously,-- in December.

Then if we pass to the 20th of January,, 1905, given on page 91 of the transcript, also, we find that well no 7 has attained to the elevation of 5.3 feet above well S, which has never occurred in the record previously to that time. Then we pass to the 4th of February. The difference between the two wells is again changed so that well no. 7 is only 1.8 feet above well S, showing a very much greater fall again in well S than there was in well no. 7, which in my opinion demonstrates other influences affecting the Hellman well no. 2 or well S than any of those influences which acted on well 7.

If we pass to page 95 of the Reporters transcript, I will read off the calculations I have made showing during the period covered by the measurements on that page the height which well no. 7 stands above well S or Hellman well no. 2 on each date:

January 20, 1906,	1.9 feet
February 1st, 1906,	2.5 "
February 14, 1906,	1.9 "
~~March 7, 1906~~ Feb.24,1906,	2.4 "
March 7, 1906	1.9 "
March 19, 1906,	1.5 "
March 27, 1906,	2.1 "

	April 3, 1906,	1.7 feet
	April 16, 1906,	2.2 "
	April 24, 1906,	1.9 "
	May 10, 1906,	1.6 "
	May 19, 1906,	2.4 "
	May 28, 1906,	2.3 "
	June 9, 1906,	1.5 "
	June 30, 1906,	1.8 "
	July 27, 1906,	2.3 "
	August 16, 1906,	4.2 "
S	September 1st, 1906,	2.2 " ~~xxx~~

Mr. Britt: Q Did you observe that measurement of August 16, 1906, was corrected from 1348 to 1346?

A I did not. Then that correct~~xxx~~ it 2 feet That would make it 2.2 feet on that date. That is true. That had escaped my notice. But taking the record, it shows a fluctuation of considerable moment, running from .8 of a foot down to .3 of a foot between those wells, showing that there is some other influence acting on Hellman well no, 8 than is acting on well no. 7; and not having the pumping record of the Cucamonga Water Company, it would be impossible to analyse this fully, as that year the Cucamonga Water Company was pumping and the San Antonio Water Company was not pumping (1906), and in my judgment it would be incomplete without that record.

Now, if we turn to page 96 and continuing to page 97 of the Reporters transcript, and taking the elevations of the two wells given on that page and on page 46, we find the following differences in elevation between the two

wells, on September 15, 1906, well no. 7 2 feet higher than well S. and all of the others are elevations of well 7 above well S which I am reading:

Septmeber 29, 1906,	2.3 feet
October 12, 1906,	2. "
October 26, 1906,	2.3 "
November 24, 1906,	2. "
December 7, 1906,	1.8 "
December 28, 1906,	2. "
February 2,	1.8 "
February 9,	2.5 "
February 20,	2.3 "
March 2,	2.4 "
March 31,	3.2 "
April 16,	2. "
April 27,	2.8 "
May 6, ~~19~~	2.9 "

showing a very wide range of fluctuations between the water plane at these two wells, not corresponding on any two consecutive dates of making measurements, and as I said before, signifying in my opinion that ~~th~~ other influences--

Q You needn't repeat that.

A Then taking up the tabulation of the elevationsof these wells on page 3468 of the transcript, covering a portion of the years 1907 and two measurements in 1908, we find the following, beginning with ~~april~~ 1907. These figures that I am going to read will be the elevation which well no. 7 is higher than well no. S:

May 18,	2.9 feet
June 1,	3.3 "
June 14,	3. "
June 28,	4.2 "
July 11,	3.1 "
July 30,	3.2 "
August 17,	2.1 "
August 30,	3. "

And up to that time there had been no pumping of the Haskell well, in spite of which the fluctuation was as much as 2.1 feet in the difference of elevation between those two wells, which are, therefore, not in sympathy.

After the pumping the fluctuations continued, as follows:

September 19,	1.3feet
September 28,	.8 "
October 12,	1. "
October 19,	1. "
October 21,	2.5 "
October 31,	4.1 "
November 14,	3.8 "
November 26,	3.8 "
December 4,	1.2 "
December 14,	.9 "

Then in 1908,

January 1st,	3.8 feet
January 9,	3.7 "

showing again the wide range of variation between those wells and that one does not follow the other in sympathy ~~there~~ ~~wither~~ ~~when pumping or not pumping, but that~~ there

are extraneous causes which are not in evidence in this case as to their details affecting Hellman well no. 2.

Q What relationship do you find, if any, Mr. Finkle, between the different wells and tunnels of the San Antonio Water Company, taking all of them and describing their sympathy or lack of sympathy with any one of the other.?

A Taking first the Eady Tunnel, which is owned jointly by the San Antonio Water Company and the Ontario Power Company and Cucamonga Water Company, and comparing that with the 16th Street wells, I believe I explained yesterday and showed diagrams that those two were not in sympathy -- the matterhaving been tested thoroughly since the bulkhead was placed in the tunnel. Now my reason for that is, that the Eady Tunnel obtains its water from the deep wells in the ancient formation. There is only a small accession of ~~wat~~ percolating water from the recent formation, and this small accession is water which has already passed so far towards the outlet that it is no longer an essential factor, or in contact or supplying the 16th street wells in any manner. Then we turn to the 16th Street wells themselves, the wells which are close together in the gravels, from 1 to 5, as they are numbred in the case, are drawing from very coarse gravel beds which are prolific in percolating water moving rapidly through the gravel beds, and the pumping of one of these wells almost at once affects the others as appears from the tabulations, records and observations which I have made on the ground.

If you take the two Haskell wells and compare them with

the other 16th S treet wells, the most puzzling feature in the case is injected ~~into it~~ to which I have devoted more time and study than any other one feature. As the pumping of the 16th Street wells, 1 to 5, have apparently no effect on the Haskell well, there is no law governing th relation of the Haskell well and the others on 16th Street. At the same time, the Haskell well wa s not a rtesian, which I have from personal observation when it was drilled, and not in sympathy with the Hellman well or the Cucamonga Springs and Y Tunnel, as has been stated by all the figures and records in the case. Therefore, the Haskell well really may be assigned to a group by itself, which is in the very margin of the gravel basin ~~have mingled freely with the~~ where denudations from the Red Hill formation have mingled freely with the recent gravels; and this mingling ~~is~~ has brought about conditions of compactness which, while it produces no artesian water at that point, has so solidified and compacted the recent gravels by the large preponderance of old material washed down from the Red Hills in that neighborhood as to make that well practically in what we might call still water in the reservoir where water is not moving with any velocity underground in any direction.

Another factor which corroborates that theory, is the location of the Haskell well in the corner of the basin. Explorations around that demonstrate the ancient alluvium to extend very close to that point, and the waters which are poured into the basin or were poured into the basin when the recent gravels were laid down, would have a still effect

in that corner, forming, so to speak, an eddy; and, as we are aware, in the eddies of storm channels of every character, there is deposited finer material than in the main trend of the channel. Therefore, in my judgment, the fine deposits caused by this sluggishness of the flow, as well as the intermingling of the degraded material from the Red Hills, has brought about such a condition of compactness as to prevent any relation of the Haskell well with the other 16th Street wells, although they are in the same recent formation. I believe that fully explains the phenomena which is exhibited in the figures and tabulations as well as diagrams submitted in this case.

Q State, in your opinion, whether any of the diversions made by the San Antonio Water Company affect any of the waters on ~~xxxx xxxx~~ plaintiffs' land.

A They do not.

Q Have you any reasons in addition to those which you have given?

A I believe I have covered the reasons. I have shown the manner in which the water travels and how they are separated from one another, and to give them again would be mere repetition.

Q You have testified to the supply naturally feeding the Cucamonga basin: What in your opinion is extent of the strata of water in that basin?

A There isa very large area of gravel basin which impounds and retains eenormous quantities of stored water, so that in dry years the outflow to the west from that

basin is almost as great as it is in better years; but the supply is so large as to prevent a rapid decline of the water plane and exhaustion of the water supply. I cannot make this any more plain than I did in the McPherson case, that by stating that 15 ~~miles~~ square miles of that material and 600 feet in depth, as shown by the wells (it is probably deeper at many points) but taking that depth, it would impound sufficient water to give 13 of 1400 inches continuous flow for a hundred years if drawn off in that manner and the basin wholly emptied.

Q Do you mean with or without replenishment by the San Antonio Water Company?

A Without any replenishment whatever.

Mr. Haskell: Flow where? Into the Cucamonga Springs?

A No; because its outlet is to the west and south west and at a lower level than the Cucamonga Springs.

Q When you say "furnished a flow", what do you mean?

A I mean through its natural outlet towards the Santa Ana River and the Chino Ranch.

Mr. McKinley: Q And by taking it from the basin by wells?

A Yes; and by taking it from the basin by means of wells,

Q Have you made any calculation as to how much the San Antonio draught affects the water plane?

A I have.

The Court: You used the term "flow": Is there a stream flowing from this reservoir to the west?

A No; I spoke of it as a flow, but it is a percolating flow. The outlet is very wide and it moves by percolation with considerable rapidity, as the formation is very coar se

west of all the Red Hills.

Mr. Haskell: I would like to see that outlet.

A In order to show that I would have to have one of those topographical maps.

Mr. Britt: I think the imaginary outlet has been described here sufficiently, and it is scarcely needed to be described again. He has even photographed it.

A Mr. Haskell made the inquiry.

Mr. McKinley: I object to the question on the ground that it is not the time for general cross examination.

The Court: Sustained.

Q Will you give your calculations?

A These calculations are based on the whole diversions of the San Antonio Water Company. These calculations are based on the diversions less the replenishment.

Q But all the diversions, is what I am getting at.

A It is based on all the diversions.

Q Both pumping and by tunnels?

A Taking the Lady tunnel and all of the pumped water from '95 to date.

Mr. Britt: We would much rather that it go from the beginning than to have it commence after the beginning of the action.

A Taking the minimum estimate that I made of the replenishment by the San Antonio Water Company, the excess draught in that 14 years, from '95 to date, would have lowered the water plane on 10 square miles 9.27 feet if no supply were coming in and no other draughts made, and the voids were one-third.. On 15 square miles it would have been

6.18 feet under the same conditions.

Mr. Britt: Draught for 14 years commencing in 1895?

A And taking the maximum replenishment which I estimated, the lowering would have been 4.94 feet in 14 years on 10 square miles, or 3.3 feet on 15 square miles in the 14 years, based on the same assumption.

Q In speaking of the storage of the basin you said 15 square miles: What does that cover?

A That only covers a part of the basin, which we know to be very coarse and productive. No doubt the basin is much larger.

Cross Examination.

Mr. Britt: Q We will commence right where the witness left off: What do you estimate to be the draught of the first of that series of years?

A The total draught of 30 inches in six months or 15 inches for the whole year.

Q That is 1895?

A 1895.

Q How? By what means?

A The 16th Street well north of Base Line; pumping from that well.

Q For 1896?

A The same .

Q For 1897?

A Nothing.

Q 1898?

A 42.5 inches, or 30 inches from the Eady Tunnel and 12.5 inches from the 16th Street well no. 3

Q Where do you get the 30 inches from the Eady Tunnel?

A That is the water which Mr. Stowell was renting to the Ontario people in 1898 from the Eady Tunnel.

Q What time did he begin to supply it to the Ontario people in 1898?

A I don't know.

Q Why then do you assume that there was a draught of 30 inches through the year 1898 from that source?

A I was making this calculation of the draught on the water plane, and I didn't wish to appear to get the draught down to anything lower than it really was, and I threw the benefit of the doubt against the side on which I was employed in the case.

Q You think that was throwing the doubt against the side on which you were employed in the case?

A I think so.

Q If the San Antonio Water Company is able to establish that it was diverting 30 inches of water from '98 through the Eady Tunnel, wouldn't it increase its probability of obtaining the defense of the statute of limitations?

Mr. Burr: We object to that; that is not an expert question or answer.

The Court: The objection is sustained . Plaintiffs exceptx.

Q You don't know, then, for what time or what length of time in 1898 there was 30 inches received by the San Antonio Water Company from the Eady Tunnel?

A From personal knowledge, no; but the testimony in this case is that they rented the water that year.

Q I don't ask you what the testimony shows.

A From personal knowledge, I don't know anything about it. I wasn't there that year to look at it at all

Q Now, in addition to that, you have 12.5 inches from the 16th Street well? Where do you get that quantity?

A Based on Mr. Frankish's testimony that they pumped about that amount that year in the irrigating season, which I estimated at six months.

Q Did Frankish testify that he pumped six months that many inches?

A No; he said during the irrigating season.

Q Did he so testify?

A I don't remember his words, but Mr. Frankish and Mr. Leeke and others testified that they pumped during the irrigating season. The time is not fixed any more definitely than that.

Q You measured in March, 1899, yourself and found only 14.40 inches from that well?

A I did. That was all that was pumped the day I was there on the 15th of March, 1899.

Q What was the abstraction of 1898?

A 30 inches from the Eady Tunnel--

Q I mean 1899.

A I took Mr. Trask's figures of 120 inches from the Eady Tunnel, 25 inches from the 16th Street well, according to the testimony of several witnesses, and some knowledge which I had of the 16th Street well myself that year.

Q Did Trask testify that there was 130 inches drawn from the Eady Tunnel throughout the year 1899?

A Not 130, but 120 ,

Q 120 inches? Did he so testify?

A In his tabulation on page 2562 of the transcript, 1899, 120 inches.

Q Didn't you testify here that you went in August, 1899 to ascertain when the San Antonio Water Company began to receive or was receiving the quantity of water that it contracted for with Stowell and the Cucamonga Fruit Land Company?

A I made a number that year, and one of them was August 25, as you say. You will find my testimony of those measurements in the tabulation on page 3968 of the transcript.

Q You measured the water from the Eady Tunnel that year?

A A number of times.

Q Going to the San A ntonio Water Company?

A I did.

Q What did you find in January?

A January 15, I measured 96.4 inches. Of that I found that more than half was going to the San Antonio Water Company.

Q 48 inches, wasn't it?

A I don't know; something over half; 54; all the pipe line would carry; 54.4.

Q What did you find in February?

A I wasn't there in February.

Q How much did you find in March?

A 30 inches is my estimate in March. I didn't measure it.

Q Where did you see that?

A On the 15th of March when I was there with Mr. Stowell

[illegible]

[illegible]

[illegible]

and Mr. Shepherd, the 8-inch pipe line was carrying what I estimated to be 30 inches. I testified to that. I have notes of it here in my book.

Q That is a long ways shorth of 120 inches.

A Of course, it is; that wasn't in the irrigating season exactly there.

Q Don't you know that in the spring of 1899 that irrigating began in February?

A I know they irrigated off and on all the year, but not so heavily as in the hot weather.

Q Yes; but you know there was irrigating going on in March.

A Evidently, or they wouldn't have taken this 30 inches if it hadn't been going on.

Q How much did you find in A pril going to the San Antonio Water Company?

A In April there were 73.45 inches on the west line of the 90-acre tract which was attributable to the San Antonio Water Company, and I am not sure but what they had pipe line capacity enough to take it.

Q Don't you know they did not?

A There was one that would carry 54 inches and another would carry 21, which would be 75 inches; but I don't know whether he was carrying water through the pipe for himself or not.

Q Then you don't know how much the San A ntonio Water Company was getting at that time?

A I simply know what they had coming to them at that time. I don't know w at they were actually getting.

Q How much did that company get in May from that tunnel?

A I don't know; I wasn't there in May.

Q I n June?

A I didn't make any in June.

Q In July?

A I didn't make any in July.

Q August?

A 124.55 inches.

Q Its pipe line was not completed until that date to enable it to carry that water which was purchased from Stowell and the Cucamonga Fruit Land Company?

A It was completed some time previous to August.

Q It was a very short time before?

A I don't know.

Q Do you know what time it was begun?

A It was begun right after that contract of April 8, but I don't know when it was completed.

Q What pipe line did it have to carry water connecting with the Eady Tunnel previous to the completion of that 22-inch pipe line?

A An 8-inch pipe line, capacity of 54.4 inches; and then on the west side--

Q I am speaking of the Eady Tunnel.

A That is the only one from the Eady Tunnel.

Q They couldn't have taken more than 54.4 inches from the Eady Tunnel till that new pipe line was completed?

A No; but they could have taken it from the west side if they wished.

Q You don't know whether they got any water from the west side other than the Eady Tunnel?

A I do know that they did get some. Mr. Stowell pumped some for them in August. It was part of this 124.5 inches which was pumped from the wells with the air compressor, and they kept on pumping all that summer.

Q Do you mean after August?

A They began long before August.

Q When did they begin?

A I don't know when they began, but they began long before that and they continued to pump that summer. I wasn't there all the time and I can't give you the dates, but I know in a general way that that was the fact.

Q So that so far as the Eady Tunnel is concerned, you don't know of any 120 inches being taken before the month of August of that year?

A Not from my own measurements.

Q From anybody else's?

A I think the completion of the pipe line is shown, and when that pipe line was completed they commenced to take from 124 inches up. I believe I have another measurement of 127.35 inches on the 13th of December, 1899, which they took through that same pipe line.

Q You have made estimates here on the assumption that there was 120 inches through that year?

A I didn't make this estimate; it is Mr. Trask's estimate; they took over 120 inches in the latter part of the year; and whether that is an exact average or not, I can't say. It is probably as close as anybody could estimate it.

Mr. Britt: I move that the statement that it was as close as anybody could estimate it be stricken out as not responsive to the question, and that it is incompetent and not within his province to state.

The Court: Stricken out.

Q In the year 1900 what do you estimate the taking of water to have been by the San Antonio Water Company from the Eady Tunnel and 16th Street wells?

A That year I estimated 104 inches from the Eady Tunnel, continuous flow, and 110 inches from the 16th Street wells.

Q Where do you get the 104 inches from the Eady Tunnel?

A From the tabulation on page 2562, which was given by Mr. Trask.

Q And the 110 from the 16th Street wells?

A I made a calculation based on the tabulation on page 2469 of the Reporters' transcript.

Q Mr. Trask's testimony of March 16?

A No, I don't know when it was, but it was testimony of actual, measurements put in.

Q What page?

A 2469 of the transcript. Measurements from the Haskell well and well no. 3. They were based on those measurements by calculations which I made of the two measurements of the Haskell wells and well no. 3.

Q You think that is a fair average of the yearly flow in that season?

A I thought so; I can give you the method by which I arrive at it.

Q Well, I don't care about that. Now, in 1901, what were the elements of your estimate?

A 118 from the Eady Tunnel and 141 inches from the 16th Street wells.

Q Where do you get the 118 inches of the Eady Tunnel?

A I took that from page 2562 of the Reporters transcrip t from the tabulation submitted by Mr. Trask and testified to by him.

Q 142 to the 16th Street wells?

A 141.

Q Where do you get that?

A Taken from the measurements in the testimony of well no. 2, 3, 7 and 8, and adding them together.

Q Found where?

A I can't give you the pages; it is scattered through the testimony. But adding those measurements together, I find that they amounted to 282 inches, and as the length of the pumping season was not given, I assumed that it was six months, and dividing by 2, made 141 inches.

Qr. Mr. Finkle, those were wells 1, 2--

A No; wells 2, 3, 7 and 8; and if I am not wrong in my recollection I think the measurements were made by Mr. Trask, or they may even have been made by Sanders and Hobby. They were taken from measurements given in the case.

Q Where did you get them?

A I took them from the transcript.

Q Haven't you any reference to the pages?

A I have not; I will have to look that up for you, if you

wish me to, later; but you can find it yourself in the transcript.

Q Have you a specific measurement or measurements?

A No; I have the total . I took the measurements and added them up and took half for the irrigating season, and it made 141 inches.

Q Give us the figures which make a total of 282 inches.

A I haven't got the figures here. I thought Mr. Trask gave you those in his cross examination. You interrogated him on the subject.

Q But you got 282 inches. By what several smaller sums is that made up?

A I am unable to give you that unless I can have time to look up the transcript.

Q How much from well 2?

A I stated that I am unable to give you that, as I made no notation of the amounts. I would have to look through Mr. Trask's testimony and give you the citations. But I know this was taken from the transcript and it is correct.

Q In what form have you that in your memorandum which you are reading from?

A I have it in my note book where I have assembled all the measurements for each year of the 16th Street wells.

Q How much have you assumed there for well no. 2?

A I haven't put down the items; I simply added up each well and put down the aggregate. I will have to go back into the testimony to pick up the items again. But I

know you will find them to add up to 282 inches if you go back and assemble them.

Q We desire very much for you to go back and give us those elements.

A I can give you that by to-morrow morning, possibly.

Q All right. Pass to 1902; what is your estimate for that year?

A Of the wells, do you mean?

Q No; the total abstraction by the San Antonio Water Company.

A I adopted Mr. Trask's first figure on the Eady Tunnel, 195 inches, for 1902, although my own calculation makes it 203 and a fraction inches, and I took the lower figure. In fact, I made this calculation before I made my own calculation for the flow of that year.

Q Where did you get the 195 inches? from the Eady Tunnel?

A That was taken from Mr. Trask's tabulation as it originally appeared on 2562 of the Reporters transcript. Since that time I made a new calculation of my own, and that figure should really be 203 inches, and I will give you the fraction in a moment.

Q In that instance you reversed your former plan of giving the benefit of the doubt against the party for whom you are testifying?

A I ~~dex~~ made that calculation before I determined the error in Mr. Trask's number.

Q You have given Mr. Trasks figure at page 2562?

A The difference is so small that in this kind of a calculation it doesn't make any material difference in the result, so I didn't go back and make it over again.

Q Give us your own calculation of 203 inches.

A 203.55 is my own calculation, and that is based on Mr. Stowell's measurements in exhibit 69. In the last column, ~~the measuring~~ box of the San Antonio Water Company, at the measuring box, Mr. Stowell gives the beginning January 5th, 1902, at 122.13 inches, and ending on April 25, 167.31 inches. From the number of measurements which I averaged, I found the mean was 128.3 inches.

Then on the same exhibit, under September 2, 1902, Mr Stowell gives a measurement of 213.8 going to Ontario Colony from Ladie tunnel; and then the contract shown in evidence here, and testified to, that the Ontario Power Company was that year leasing to the Cucamonga Water Company, 65 inches of water, which added to the 231.8 , making it 278.8 inches.

Q You don't know whether it got it or not?

A Well, I assume they did; they paid for it and leased it.

Q You don't know whether they paid for it.

A I believe that was testified to here, that they paid for it.

Q Who testified to it?

A Mr Leeke or Mr Shepherd; or they might have stated that to me without testifying to it; but I assume ofcourse that they got it.

Q September 2, 213.8 inches?

A Yes, sir; plus 65, that makes 278.8; and adding that to the 128.3. the early part of the year, and taking the average, which would be 203.55 inches for the whole year.

Q Well, you had 278 - -

A And .8, for the last half of the year, based on the September measurement; for the first half I took the mean of the early measurements, 128.3.

Q Well, that was the whole flow of the tunnel.

A That 128.3?

Q Yes?

A I don't so understand it. That was what Mr Stowell testified to, that that did not include what went to the

Then on the same evening, under September 3, 1907, a Bonnell gives a summary of [illegible] [illegible] to Cyprian Talney from Delia Lucas]; and then the constant phrase in [illegible] here, due beautiful to, that the Indian [illegible] [illegible] was that year leaving by the Chesapeake Water Company, in inches of water, which added to the [illegible], making it [illegible] inches.

Q. You don't have another [illegible] in only?

A. Well, I remember very [illegible]; they paid for it and leased it.

Q. You don't know another thing [illegible] for it.

A. I believe that was identified [illegible], that they said for it.

Q. The testified to it?

A. [illegible] to testifying, or they might have written that to me without testifying to it; but I remember [illegible] they got it.

Q. September 3, 1907, [illegible]?

A. Yes, sir; plus 10, that makes [illegible] and adding that to the 100.3. The entry part of the year, you taking the average, which would be [illegible] for the whole year.

Q. Well, you had [illegible] - -

A. And .8, for the last half of the year, based on the September measurement; for the first [illegible] had the same of the early measurements, [illegible].

Q. Well, that was the month flow of the tunnel.

A. That [illegible]?

Q. Yes?

A. I don't so understand it. That was what [illegible] testified to, that that did not include what was in the

Cucamonga Water Company and to other places, in that early period before the stock of the Ontario Power Company was acquired by the San Antonio Water Company; this was the water that went under the old contract as I understand it, the 130 inch sale to the San Antonio Water Company.

Q Well, you take the 128 inches for what time?

A Six months.

Q And 278 for six months?

A Yes, sir; after they acquired the Ontario Power Company.

Q You say that would make an average of how much for the year?

A 203.55.

Q Well, what did you have for the flow of the wells that year? Before you proceed to that, does it make any difference in your estimate, that a great part of that water in the latter part of 1902, from the Padie tunnel, was pumped water? Does that affect the question?

A I don't see how it does; the facts showing the transfer of the property accounted for the increase of the water going to Ontario, not anything as to pumping.

Q Don't you know that for that year it was the pumping that made such a large accession of water?

A I don't remember any testimony about pumping that year, except that of Mr Stowell, that he pumped throughout the year, and changed his pulley and increased the pumping sometime in May; but the pumping was in 1903 and 1904 which was done by the San Antonio Water Company, from October 27, 1903 to February 16, 1904; Mr Stowell testifies to pumping during the whole irrigating season of 1902, as I understood it.

Q Wasn't it that large accession of water in Septe ber that was produced by pumping? However, if you don't re ber all right.

A Well, I think I have the figures here if I can find them.

Q Well, don't take the time: whether it was pumped or not does that make any difference in your calculation?

A I take the pumping into account, according to Mr Stowell's testimony, that he pumped that irrigating season.

Q Did that pumped water come from the old alluvium or the recent alluvium?

A It came from the Stowell artesian well, which would be in the ancient alluvium.

Q In your estimate of outflow, depletion of gravels and so on, you count diversion from the ancient alluvium as well as the new or recent alluvium?

A In this tabulation of diversions, I have taken the draft on both formations, to show the total a ount of water that the San Antonio Water Company took out of that locality.

Q Do you think that the draft from the old alluvium, affects the elevation of water in the new alluvium?

A No, sir; I don't think so; and I did not make the calculation on that theory; I think that it does not affect it.

Q Why then did you include it in the estimate of the draft made on the gravel basin?

A Well, the whole gravel basin of all the alluviums, generally speaking, was considered in that estimate; they are both gravel basins; that is the ancient formation is an older formation, and - -

Q Older gravel basin?

Q. Don't it look large numerics of value in people for that are problem in quality. Answer, if you don't remember all right.

A. Well, I think I have the figures here if I can find them.

Q. Well, let's take the time: Whether it was signed or not have that made any difference in your calculations?

A. I take the usually low average, according to Harvill's experience, that on general book arrangements.

Q. Did that general make your fees low on clients as the general clients?

A. If your for the general private will, still would be higher than clients.

Q. In your estimate of profits, supposing it actually was so, you found difference from the average clients as well as the use of general clients.

A. In this industry of importance, I have taken the type of big firmations. In other industrial a very different thing has actually taken place of late and if this industry.

Q. Do you still hold the view that the situation, affecting the economics of value in the new situation?

A. Yes, sir; I don't think so; can I ask you some questions on that matter? I think that it came out clearly.

Q. Why does you imagine it is the activity of the retail made on the retail basis?

A. Well, the small retail basis of all the advantage, generally speaking, was considered in their relations; they are both general basis; that is the basis formation in an other formation, and - -

Q. Other retail basis?

A Yes, sir; with more of the finer sediments and silts in it; the recent one has a great deal less of the finer silts in it, and more of the coarse formation; they are all in the same locality, and I was not considering the draft from any one gravel basin, but the draft from this locality.

Q Then when you say that a certain abstraction in one year would lower the water-plane four or five feet, or ten feet, you mean that part of that would be pulled out of the old alluvium gravel basin, and part of it pulled out of the recent gravel basin?

A Well, that was all hypothetical, based upon a certain area of ten square miles and 15 square miles, for illustration, assuming that the voids occupied one third of the mass; it was not made to apply to any particular locality anywhere.

Q You estimate the voids are the same in both basins?

A No, I do not estimate that the voids are the same; they are different; but that was merely a hypothetical basin for the purpose of comparison; if you cut the voids in half, you increase the depth of draft by multiplying by two; it was simply put in the record to compare by.

Q To compare what?

A The effect upon any sized waterplane which might be considered, by applying the same ratio as given in the hypothetical calculation.

Q How can you compare the draft out of the gravel basin in the old alluviums, with that out of the new or recent alluviums?

A I would vary the percentage of voids in the ancient,

as it is very much less, and very much more in the recent.

Q You did not determine it in these computations?

A No, I simply gave a hypothetical computation, the same as I might have given for one square mile, instead of ten, based on one-third voids.

Q The one square mile would still have to be made up of a gravel basin consisting of new alluvium, superimposed upon a gravel basin composed of the old alluvium, as you say it is in this case?

A I did not apply this to either alluvium; I made a hypothetical calculation, which can be used as a gauge or standard in argument in this case.

Q What you say don't seem to possess very much value for the purposes of argument, if you make no distinction in the various alluviums. However, let us proceed: I want to know next how much water you found to be taken by the San Antonio Water Company, by means of its pumps in 1902?

A 180 inches.

Q All of these inches you are giving in this connection are constant flow?

A Constant flow.

Q How do you get the 180 inches?

A Mostly from tabulations put in by Mr Meeke, from reports made by Hobby and Saunders, for 1902, relating to the pumped water at wells number 2, 3, 4, 7 and 8.

Q Can you give us the pages?

A I can't give you the individual figures, but the total of the measurements was 300.0 inches, from all five wells.

(Last question read to witness.)

A Of the testimony?

Q Yes?

A No, not without looking it up again.

Q Wells 2, 3, 4, 7, and 8?

A Yes, sir; I believe you introduced some of those yourself from the records when Mr Shepherd was on the stand; they are found in the record.

Q I want to know the origin of your information on the subject; I think we did perhaps in the examination of Mr Shepherd and Mr Leeke.

A That has been gone into, in the record, a number of times, with Mr Trask and Mr Shepherd and Mr Leeke; if you want me to look it up I will do so and bring it in tomorrow.

Q Well, if you will I will be obliged.

A I will do all I can in that regard; I have no desire not to do everything I can in looking up these things.

Q Now, in 1903 you estimate how much from the Madie tunnel?

A In 1903 it was 229 inches.

Q Found where ? On what ~~estimate~~ evidence is that estimate founded?

A That is based on an average of all Mr Trask's measurements, at weir B, giving the water of the Ontario Power Company and the San Antonio Water Company, which was developed and flowing on their lands, and into the Madie tunnel, during that year.

Q Weir B in the Madie tunnel?

A Yes; which measures the waters of the San Antonio Water Company, and the Ontario Power Company, flowing from its water bearing lands into the tunnel.

Q Do you not recall that Mr Trask testified that the quantity received by the San Antonio Water Company, was very much less than that which flowed over weir B?

A Well, that depends on where you take it; where you say they received it; they received it when they got it into the Eadie tunnel at their line; I always interpreted the receiving as being that point, in my measurements; what was done with the water after it flows into their conduit, I have never tried to determine.

Q After it flows into the Eadie tunnel, they receive it?

A Yes, sir; after it flows into the tunnel I have never attempted to trace it out, as there was no means of doing it; there were quarrels between the Cucamonga Water Company and them about the division, and it varied from time to time, so that we could determine nothing from that fact; and I always took the measurements on theirline, which showed the water they had flowing from theirland into their tunnel; as to whether they used it or allowed somebody else to use it, I never investigated of formed any opinion.

Q And your statements then are not to be taken as founded on the quantity of water which the San Antonio Water Company took and transported from the Eadie tunnel, but only on what flowed in the Eadie tunnel?

A Yes, with this explanation: ~~that~~ that the San Antonio Water Company might have leased that water to some one, or m might have distributed it to its irrigators, or the Ontario Power Company might have distributed it to some one, as they owned part of the water. I never attempted to trace it.

Q Or to determine whether they took it away from the

Eadie tunnel?

A It must have come out from the Eadie tunnel; it could not stay there after having been once put in.

Q Or determined whether they took it away from the tunnel?

A No, I never followed it up; after it went in the tunnel I have no knowledge on the subject as to where it went.

Q If it went to waste, or if the Cucamonga Water Company obtained it, or took it and appropriated it, it was just the same thing: You count that as so much taken by the San Antonio Water Company?

A Yes, because that was taken from theirlands, and delivered into the tunnel, and it had to flow somewhere; we have no proof whether it was used or run to waste, or whether it was used by the Cucamonga Water Company.

Q Would it be a draft if it was poured out on the ground, after it came out?

A Yes, sir; because it would go on the recent formation formation below the Red Hill where it would notbenefit any water above in the sources which supplied the Eadie tunnel.

Q Well, all right. For the year 1903, what did you estimate to be the abstraction by the 16th street wells?

A 126 inches continuous flow.

Q Where do you get that?

A I added up the two measurements given in the record of wells 3 and 8, aggregating 252 inches, and divided by two, giving 126 inches.

Q From what source do you obtain this aggregate of 252 inches?

A From the measurements testified to by - I am not sure

whether Mr Leeke put those in or Mr Shepherd; there were some reports from their engineers that year, not Mr Trask; he was not then measuring; I think Hobby and Saunders, or one of them.

Q Can you identify those reports, the ones to which you refer?

A I can by making a search of the record again.

Q Have you any of the elements of the 252 aggregated here any subdivision of them?

A I have not; it is only divided between the two wells 3 and 8; I don't know how it was divided - equal or unequal parts; I don't remember; I would have to look it up in the record; wells 3 and 8 are the only ones that are given in the testimony for that year.

Q In 1904, what is your estimate taken from, for the Eady tunnel, or first give the amount?

A 180 inches is taken from Mr Trask's measurements, at weir B, on page 513 of the reporter's transcript.

Q On the 16th street wells? where is the estimate taken from for that year?

A The 16th street wells are taken from Mr Trask's testimony of 149 inches average for the whole year, based upon the continuous record kept by him that year.

Q Where do you find that?

A I can't tell you; it was referred to several times in his examination; it was the measurement of Box C I believe.

Q It comes from Mr Trask's tabulation?

A I think it appears in Mr Trask's tabulation of Box C.

Q I know where the tabulation for 1904 is to be found,

but those three years previous to that, 1901, 1902, and 1903, if you will let us know the tabulations from which you obtain your estimates we will be obliged.

A I will as soon as possible.

-o-

Here the Court takes a recess until two o'clock p.m.

-o-

Afternoon Session 2 p.m.

Cross Examination of F. C. Finkle, resumed.

Witness: I have looked up one of your dates, and I can give you reference to the record; the others I did not have time to complete. That was the year 1901 I had time to complete, for the 16th street wells: A tabulation on page 2895 of the transcript.

Mr Britt, Q What figures in that tabulation do you refer to?

A I refer to the figures given fxor well number 2, 70.3 inches; well number 3 - I believe called well number 1 in that, 72.6 inches; well number 7, 68 inches; well number 8, 68 inches. The Haskell wells numbers 1 and 2 are the numbers 7 and 8. The tabulation is on page 2895 of the transcript, the report of Mr Sanders.

Q I understand you then that the amount you give is taken from the statement in the report of Mr Sanders, page 2895, to the effect that the 16th street well number 2 was flowing 70.3 inches; and well number 1, 72.6 inches?

A Yes, sir; that is now number 3 well.

Q And Haskell well number 1,68 inches, and Haskell well number 2, 68 inches?

A Yes, sir; the other years I have not completed; I have

some of it but not all of it.

Mr Haskell, Q You say this well number 1 is now called number 3?

A Yes, sir; in the old numbering; the 16th street well number 3 used to be called number 1, because it was the first one bored.

Q Do you mean that that record on this page, referred to the old numbering?

A I do; they referred to that old numbering in the early days.

Q And that is the way it is referred to in this record here?

A Yes, sir, Mr Sanders, and also Mr Hobby, in all of their reports always referred to the old numbering.

The Court, Q Do you mean when they referred to number 1 in their reports, they referred to the one called here number 3?

A That is right.

Mr Britt, Q At the time of adjournment before noon, you were giving the data for 1904, the original, from which you computed 180 inches of water, from the Hadie tunnel, as measured at weir B, and 149 inches from the 16th street wells? I believe that is right.

A Yes, sir.

Q And that 16th street well estimate was founded on the tables given by Mr Trask, at page 82 of the transcript?

A They were.

Q Now, for the year 1905, what is your estimate for the Hadie tunnel?

A 139 inches.

Q From what sources do you obtain that estimate?

A That is obtained by taking the mean of the measurements at page 514 of the Reporter's transcript, which measurements were made at weir B by Mr Trask.

Q 139 inches from the Eadie tunnel?

A From the Eadie tunnel.

Q All of these inches mean annual inches, annual discharge?

A These are annual discharge, all of them.

Q And what is the estimate for the 16th street wells discharge for that season, taken by the San Antonio Water Company?

A 59 inches, continuous flow, in annual inches.

Q That is obtained also from Mr Trask's tables?

A It is from his tables, total output of the 16th street wells for that year.

Mr Haskell: What page is that?

Mr Britt: Page 82.

Q And for the year 1906 how much do you estimate for the Eadie tunnel?

A 155 inches.

Q Obtained from what source or what authority in the transcript?

A Brom page 514 of the transcript, taking the mean of the measurements by Mr Trask at Weir B.

Q And for the output of the 16th street wells in 1906?

A There wasn't any; they didn't pump the wells that year.

Q In 1907 how much for the Eadie tunnel?

A 119 inches.

Q What is your authority for that estimate?

A Mr Trask's tables on page 2562 of the transcript.

Q And how much from the 16th street wells that year?

A 31 inches continuous flow.

Q Wheredo you obtain that? From what authority?

A I have not a reference to that; it is a tabulation put in by Mr Trask, of which I have no copy, giving the output of the 16th street wells for various years, from 1895 to 1908; I have a copy in my note book, but no copy of the page of the transcript.

Q All right, proceed to the next year estimate - what do you estimate to be the abstraction from the Eadie tunnel?

A 155 inches.

Q The same as in 1896?

A Yes, sir.

Q Where do the data for this appear in the transcript?

A The table on page 2562.

Q And the abstraction of the 16th street wells in 1908?

A 74.7 inches.

Q Shown where?

A I have not the page of the transcript; I have a copy of the table here in my book.

Q A tabulation prepared by Mr Trask?

A Yes, sir; called output of 16th street wells, appearing somewhere in the transcript; you may find it if you have a transcript.

Q Have you any measurements, tabulations, or estimates, of the abstraction of water by the Ontario Power Company, separate from that by the San Antonio Water Company?

A No, I can give no further information on that, than that all of the water over and above 130,inches, is taken by the

Ontario Power Company.

Mr Haskell; I move to strike out the answer of the witness as not responsive to the question.

Mr Britt: It is stating a legal conclusion, and I join in the objection of Mr Haskell, and motion to strike out.

Mr McKinley: We have no objection to its being stricken out; it is in the record a number of other places.

Q Are these estimates that you have given and data that you have mentioned, founded on abstraction of water by the San Antonio Water Company, inclusive of the water taken by the Ontario Power Company?

A I so stated; that the combined flow given by me was the abstraction of both companies.

Q Now, have you any measurements, tabulations, or estimates of the quantity of water received by the Cucamonga Water Company from the Eadie Tunnel during this same period of time?

A I have testified to some measurements here in the record myself, during a portion of that time.

Q Have you taken the time, for the 14 years, in like manner as you have covered the time for the San Antonio Water Company?

A No, I have not; I have no measurements going back in the Eadie tunnel, referring to the Cucamonga Water Company's supplies, further back than 1899.

Q Did you keep any systematic or correlated series of measurements of the quantity of water received by the Cucamonga Water Company, in connection with that received by the San Antonio Water Company, commencing with 1899?

A Yes, during the last few years, because during that time the measuring box of the Cucamonga Water Company was accessible; prior to that time they locked their box, and it was very seldom that we could get into it to make a measurement.

Q Have you those for the time previous to January 1, 1904?

A There are some which I gave in my testimony; those that I could obtain, you will find on page 3968 of the reporter's transcript. all of the data which I personally have relating to that matter.

Q That is all of the measurements that you have made personally, of the quantity of water received by the Cucamonga Water Company from the Lodie tunnel?

A Yes.

Q In what years?

A Well, during 1899 from the 90-acre tract, and during 1900; and then again beginning with 1905; in 1904 they locked up their box and I couldn't get in there.

Q I am not solicitous about those after 1904, because I think that these measurements have been available to us, and been produced in the record, probably, by others.

A Then on the 15th of January, 1899; I well remember I measured 96.4 inches at the mouth of the Lodie tunnel, and a little over half of that was going to Ontario and the balance to the Cucamonga Water Company; so you may make a deduction there that the Cucamonga Water Company was receiving 42 inches on that date.

Q Now, have you kept tab, by which I might say for the present I mean tabulation, of the receipts of water, the ab-

1 straction of water by the Cucamonga Water Company from
2 the Lone Star tunnel, during recent years, or former years,
3 or at any time?
4 A I have been unable to do that, owing to their measur-
5 ing boxes being locked up most of the time; I have a few
6 scattering measurements. Those have all gone in evidence
7 here in the case.
8 Q There are two Lone Star tunnels are there not?
9 A Yes.
10 Q Your remarks apply to both of them?
11 A My remarks apply to both of them.
12 Q And also to their wells that connect with the tunnels?
13 A Yes, it applies to Well K, which is not connected with
14 the tunnels, and also those wells which are connected
15 with the tunnels.
16 Q Have you any measurements of the Hermosa well or wells,
17 which have not been placed in evidence?
18 A I have not.
19 Q Have you any measurements of the Sunset well or wells
20 which have not been placed in evidence?
21 A I have none personally.
22 Q By personally you mean made by yourself?
23 A Made by myself.
24 Q Have you any measurements at any time made of the Sour-
25 wine well, or as it has been called frequently in this case,
26 the Upland Water Company's well, which have not been placed
27 in evidence?
28 A I have none; possibly I might have depth to water in it,
29 but no measurements of water coming from the well.

Q Have you a table or data showing the elevations of water in that well?

A I have no table; I have made measurements of the elevations of water in that well, and testified to I think all of them; ofcourse I would not undertake to say that I might not have missed one, but I aimed to put them all in the other day when I gave those well records.

Q On the 15th of March, 1899, you measured the Lone Star tunnel, and found flowing there 20.5 inches of water.

Q I don't think that is the quantity.

Q That is the quantity stated here in the record. I think that is the date.

A What is the page?

Q Wait a moment; I think I was looking at the wrong date.

A On page 3969 of the transcript I give the flow as 35.6 inches on that date, in the Lone Star tunnel; that corresponds with my note book.

Q Look at page 3837: You mention the Lone Star tunnel was discharging 35.6 inches: That is correct isn't it?

A Page 3837, lines 9 and 10; Then the Lone Star development, which is the original Lone Star tunnel, was discharging 35.6 inches.

Q At that time was there only one Lone Star tunnel?

A I think so; that is my recollection.

Q Was thatgravity water or pumped water?

A On the 15th of March, it was gravity water at that time.

The Court: Is there any testimony here that there is more than one Lone Star tunnel?

Mr Britt: Yes, there are two Lone Star tunnels now and

have been for several years, Lone Star 1 and Lone Star 2.

Mr McKinley: Located one above the other; one was constructed at a considerable depth below the other.

The Court:, Are they not connected?

Mr Britt: No, sir; they are not connected.

The Court: I understood there were two lines but all practically one tunnel.

Mr Britt: Mr Wright just now suggests that they are connected by a shaft at the upper end of number 2; I believe the evidence shows that number 1 long since ceased to discharge by gravity.

The Court, Q How is it about thattunnel proposition: Are there two tunnels?

A There are two tunnels; the original Lone Star tunnel was excavated by Mr Stowell in the latter part of the eighties, and was at a high elevation, a ddeveloped this water which I am testifying to as being there on the 15th of March, 1899; later Mr Stowell and his associates acquired the 35-acre tract on Hellman Avenue, west of Hellman avenue, and they begun another tunnel there, which ran through the 35-acre tract, and then they sold that to the Cucamonga Water Company, and the Cucamonga Water Company extended it up under the old Lone Star tunnel, and connected it with the old tunnel by means of a shaft.

Q The later one is the lower one?

A Yes, sir; there is now a bulkhead in it, which is closed in the nonirrigating season, and opened in the irrigating season.

Mr McKinley, Q Just water is taken by that Lone Star

tunnel number 1?

A The pumped water is the only water now taken by it; the water pumped from well number 9, which is shown on Defendants' Exhibit "O", and flows over weir 5, referred to here as weir 5 ofthe Cucamonga Water Company.

Mr Britt, Q At that time when you measured the 35.6 inches March 15, 1899, was there any other Lone Star development at all thanthis one?

A No; that was the only tunnel; there were a number of wells there; quite a large group of wells there which I have testified to in my examination in chief.

Q Were they connected with the tunnel?

A There were some of them driven down through the tunnel, and they were pumped with compressed air during the irrigating season; they were not being pumped on the 15th of March 1899; but later in that year, and during the years since then, they have been pumped, continuing up to the present time.

Q Have you got measurements of any of them?

A I have given measurements here of the water pumped from some of those wells.

Q At whattimes?

A They are in the record; I can give them to you again if you wish.

Q All of the measurements you have of those wells appear in the record do they?

A They do.

Q And in December, 1899 the 13th of that month, you again measured the Lone Star tunnel, and found 20.5 inches, if I understand your testimony correctly.

A You are stating that correctly.

Q And that was gravity water was it, water flowing unaided by pumping?

A That was gravity water.

Q And the Lone Star tunnel number 2 had not then been constructed had it?

A It had not.

Q Have you any accurate information as to the time when the second Lone Star tunnel was constructed?

A No, I have no accurate information; it was done during a period when I was not going there, and it must have occurred after 1900, and before 1904, but just when I could not state.

Q You have not tabulated here, have you, the measurements of those cienegas on the west side of the Red Hill?

A I have tabulated in my tabulations, I think all of those measurements I have, or any which I did not tabulate,- they are contained in my recital of different measurements on the west side, made in 1899 and 1900; after 1900 those cienegas disappeared and have never existed since; they were almost gone in 1899.

Q There was a so-called Picnic Spring, spoken of in your testimony: Where was that situated relative to the Ladie tunnel?

A It was situated on the northeast of the Ladie tunnel, and a short distance from it, in a grove of willows and other trees of that character.

Q Was it on the 90 acre tract?

A No, it was not on the 90-acre tract; it was outside of the 90-acre tract.

~~Q--Which-tractwas-it-on?--On-the-land-owned-by-the~~

Q Which tract was it on? On the land owned by the Ontario Power Company?

A Yes, it was right on the lands now owned by the Ontario Power Company, and I think it was on what was known as the 53-acre tract, and sometimes the 43-acre tract.

Q Lying just north of the 90-acre tract?

A Yes, sir.

Q Have you tabulated the measurements made by you of the Picnic Springs, or are they grouped together, taken in bulk, with the other water of the so-called west side?

A They were all given in my testimony, except possibly one measurement of the Picnic Springs which was the same as on another occasion, but in tabulating I had no special column for the Picnic Spring.

Q What became of the Picnic Spring? Did it disappear?

A The Picnic Spring disappeared sometime in 1900.

Q When did you first observe the Picnic Spring?

A In January, 1899.

Q You made a measurement of its flow then?

A No measurement of its flow on that date.

Q Any estimate of the quantity of its flow?

A No; no estimate on that date; I have no notes on the subject, but I remember having seen the Picnic Spring, and reservoir number 5, which was located near it, at that time.

Q You speak of it as a stream or spring?

A We always called it the Picnic stream, because it came from the Picnic grounds; it was also known as Picnic Springs; it was called a stream; it collected water from the surface where the ground was wet, and a cienega formation, and put

into a trench, and conducted to this pipe line which passed near the Park Hotel, and I think sometimes it was diverted into Reservoir number 5.

Q Well that reservoir was what? An earth reservoir or a cement reservoir?

A It was an earth reservoir.

Q What did it reservoir?

A Various kinds of water which was collected from the surface there; I suppose at times it received water from the wells on the 90-acre tract, and from cienega D on the 90-acre tract, and from the Picnic Spring,- any of those surface waters which were higher than the tunnel.

Q I would like to have your attention for a moment to a map, concerning which you gave some testimony, being plaintiffs' Exhibit number 81: Now, this map shows the locality of the former Picnic Spring, does it.

A Yes, sir.

Q It was situated about where?

A The place marked "ditch" on that map, which is east of the two-acre tract, and the wells marked Well, 1392.2, 1395.6 and 1343.3, and the picnic ground or area, from which this stream was collected, was above that ditch, and the ditch was cut into it, draining it into reservoir number 5, which is marked "reservoir" on the 90-acre tract.

Q When did you first observe that Picnic Stream?

A The first time I saw it was January 14th or 15th, 1899; I was there on both of those dates and remember seeing it at that time.

Q Have you given any measurement of water from that Spring

in your testimony here?

A I think I have, but not on the 16th of January, 1899,- I did not measure it.

Q I will be obliged if you will put a mark there, with word "Picnic S", about the locality of that water manifestation?

A I have done so and marked it "Picnic S" .

Q Now, there was also mentioned in your testimony a Tiburcio Spring, somewhere in that locality: Does this map, plaintiffs' Exhibit 81, cover the ground where it was situated?

A Yes, sir; it shows the Tiburcio Spring with the cut and tunnel running to it.

The Court, Q Just at the south end of the little red hill?

A Yes, sir.

Mr Britt:

Q Have you given some measurements of water from the Tiburcio Spring?

A No; just estimates; I have estimates in my testimony in the tabulation which includes that with other water going to Ontario, 40 inches at one time and 20 inches at another time.

Q When did it disappear?

Q Well, that was as a spring extinct before 1899, but this cut and tunnel had been run in, and was still drawing some water at that time.

Q You don't know what quantity of water it supplied before any tunnel was extended to it?

A No, I do not; I never saw it before that tunnel was built.

Q In 1899, it appears in your measurements, there was water coming from what is marked on this plat Exhibit 81, "West Cienega"?

A Yes, I gave several measurements of the flow from that cienega,- from trenches, I mean, which were cut into the cienega.

Q That flow was collected in those trenches which are marked on this map?

A Yes, the two trenches which are marked on the map, branching one to the east and one to the west, and I have specified the measurements as belonging to either one or the other.

Q That cienega also disappeared I believe?

A That was practically gone in 1899, but down near the branches there was a little moist ground, and those small streams I have testified to remaining in the trenches.

Q Were there any other surface manifestations of water at that time, in 1899, which have since disappeared, on the west side of the Red Hill?

A No, not that I know of; I am not quite sure that I saw them all.

The Court, Q Speaking of the condition on the west side of the Red Hill, when we were there on the 10th of March, there was quite a change in condition, was there not, as regards trees, from what the conditions were in 1900?

A I believe a great many of the trees have been cut down since that time; for instance, in the Picnic grounds, where the Picnic Stream came out, there used to be a dense growth of trees which have since been cut out.

Q They were there in 1900?

A They werethere in 1899 and 1900; most of them at least.

Q How is that in regard to trees, on the east side?

A On the east side the timber is just as dense now, as it

A On the east side the timber is just as dense now as it was, as near as I can remember; I can't remember any change of the timber on the east side.

Q I beg your pardon for differeing with you, but I think you are mistaken, because I remember chasing out an owl one time there.

A There was a fire went through that east side which killed some timber, and I think ~~xxx~~ the tree you refer to where the owl was, is now a charred stump and shows in one of Mr Track's pictures.

Q It was not a single tree; there was quite a clump of woods there, and I remember trying to get through it; what I was getting at though, would it have any significance as to the flow of springs?

A There are certain trees which do thrive only where springs rise, or water percolatesfreely in the ground, such trees as alders or willows; ofcourse if the springs are dried up, or if the percolating waters are removed, such trees as those would die; now, as I remember it at the present time, there is in the bottom of a creek on the east side a dense growth of timber, above the diversion of the ditch, but on the side of the hill, where the fire burned up all the young trees and killed the old ones, there is nothing but charred stumps.

Q I meant to the eastward of the hill on the flatter lands- I didn't mean on the side of the hill.

A On the flatter lands, I remember a good deal of timber in 1900, that is on the lands toward the Y tunnel, but that has been plowed and cleared up since that time.

Q When you speak of the trees being cut down on the Picnic grounds, isn't it a fact that those trees died, many of them, before they were cut down?

A I have not been acquainted with the country, between 1900, after the trialof the McPherson suit, and 1904, and the trees were all alive at that time, and I am unable to state what happened to them, as I was never there and didn't see them, between those times I mentioned.

Q You don't know whether they were cut down or not?

A Well, I assume they were cut down, because I can see the stumps there, and can see where the ax has left marks in places.

Q You don't know whether they died before they were cut or not?

A No, I do not.

Q What sort of trees were they?

A Those were sycamores and willows, principally.

Q By the Court, What was the character of the trees there as to requiring water or indicating water?

A Sycamores do not indicate water near the surface.

~~in brief,~~ Q Do you mean the trees were all sycamores?

A No, sir; some of them were not; some were willow and some were sycamores; the sycamores, as I stated, do not indicate water near thesurface, but simply a fine enough soil, and with enough clay and sand to retain moisture well; while willows indicate water near the surface.

Q Was it the same character of timber on the east side as on the west side?

A Well, there were more sycamores, as I remember it, on

the east side than on the west side. But in the swamps or cienegas on the east side there were a number of willows and water motios, and in the Cucamonga Springs channel there were a good many alders growing, which there are yet - a very large number.

Mr Britt, Q Could you note on Exhibit 81, the point to which the Eadie tunnel had been extended in 1899, when you began to make measurements in that locality?

A Not exactly; I can only say that xxxit was near the south line of the two-acre tract, or it might have been some distance into the two acre tract; not very far, the way it is depicted on this map, at this time. Some of these wells were cut into the tunnel, and work was in progress to connect others with it on the two acre tract.

Q Now, that two acre tract is so marked on the map, exhibit 81, isn't it?

A Yes, it is so marked on this exhibit.

Q And was virtually the head of navigation in that tunnel in the year 1899?

A Yes,; it had not been extended beyond the two acre tract; I am sure of that.

Q Can you indicate on that map, exhibit 81, by reference to some other exhibits here, the locality to which the Eadie tunnel was afterwards extended, to well number 14 as it is called by the plaintiffs and number 5, as the defendants call it sometimes? I would like to have it marked there with some degree of accuracy, although it might not be with entire exactitude.

A I have marked on Exhibit 81 a dot, and the words "Well num-

ber 14" , at the point where the tunnel now ends.

The Court, Q Is that well right on the line of the tunnel or a little to the left of it?

A The tunnel finally reached the well by a circuitous route, which is shown on plaintiffs' Exhibit 1.

Q Does the tunnel go right to the well?

A It runs right to the well and connects with the well; there is a shaft at that well running down to the tunnel.

Mr Britt: That is the well that was reached by a succession of galleries.

Mr Britt: Now, Mr Finkle, you know the locality of the bulkhead which was put in the Eadie tunnel in 1907?

A Well, about the locality.

Q Could you indicate that also on this map, exhibit 81?

A I find that I have no information enabling me to locate that bulkhead; it is somewheres on the 90 acre tract, but I don't know the distance from the portal of the tunnel.

Q Now, will you mark there, the place of station 20, where I understood you to say that the tunnel emerges from the older formation into the more recent?

A That station 20 is a short distance beyond the point marked "Branch tunnel" which is located there as branch tunnel; I did not mean to say the tunnel itself emerged from the old formation at that point; but by following the branch tunnel to the west that the point of contact was shown, 60 feet below the surface in the branch tunnel. The main tunnel itself I never saw the point of contact and where it emerged, and all I know about that is going down

the shaft near the west line of the 90-acre tract, known as the cement shaft, that it is in the recent formation at that point. I was accompanied by Mr Stowell into that branch tunnel and saw that place. I know it emerges som where north of that branch tunnel from the old formation, and between that point and the west line of the 90 acre tract; just where I don't know.

Q That tunnel simply runs out on the north side of the Red Hill does it,- the branch tunnel?

A The branch tunnel ran out into the recent formation, where the formation was dipping to the north, the same as throughout the main tunnel, until you reach the shaft at the west line of the 90 acre tract, where there was no dip to the formation, and the whole thing was gravel and sand.

Q At what distance was this point, or did you make any note of it, was this point in the branch tunnel, west or westerly from its junction with the main Nadie tunnel?

A Do you mean how long was the branch?

Q No. I want the distance to where you observed the burrow holes?

A That was near the end of the branch tunnel; I don't know just where, but somewhere near the west line of the 90-acre tract there was a place where the branch tunnel emerged, so that the contact between the two formations was visible there for 30 or 40 feet in distance.

Q What do you mean by that? That the mixture of the two formations was going on for that distance?

A No; that the separation was evident for that distance,- that the old formation was in existence dipping to the north

with the burrow holes and the roots of trees or shrubs in it, and that superimposed on that, and unconformably to the old formation, was the gravel and sand of the recent formation.

Q Well, you have there the steep north side of that hill, haven't you?

A No, the west side is steep -

Q The west side I should say.

A The west side is steep - not the north side.

Q The steep west side of a hill?

A On the surface; yes, sir; but the dip was not to the west; it was to the north.

Q Does not that hill slope to the west?

A On the surface the hill slopes to the west, but if you excavate - - in the tunnel the dip of the strata were all to the north, as shown on the profile of the tunnel which I have drawn; they were not dipping to the west.

Q That station 20 that you mention is about the point of junction between that lateral tunnel, and the main Bacie tunnel is it?

A Just about that point, yes.

Q That was the angle at which that formation dipped to the north?

A I did not measure the angle, and so I placed an arbitrary angle on my profile, but I think it was a little steeper than what is shown on my profile of the tunnel.

Q Well, what angle have you shown on the profile of the tunnel?

A About one foot in 40 or 50, as near as I can measure it;

I think the dip was sharper than that at the point where I saw it, but not so very much sharper.

Q Are you able to state about how much sharper?

A Well, I didn't have any instrument to measure it with?

Q Would that be correct within a range of fifty percent?

A I wouldn't say; within a range of one hundred percent I think it would be correct, probably.

Q In certain comparisons which you made, between the elevation of water in well number 3 of the San Antonio Water Company, and the discharge from the Y tunnel and the Cucamonga springs, and which you have embodied in a table denominated "Tabulation of water elevations, and discharge measurements, showing the existence of no relation between hydraulic head at well number 3, and Y tunnel & Cucamonga Springs", at page 3861 of the Reporter's transcript,- I suppose you have it before you,- if not please turn to it: You have it before you?

A Yes, sir.

Q The first elevation given there, March 15, 1899, elevation of the water in well number 3 is stated as 1397.2: That means feet above sea-level?

A That means feet above sea-level.

Q Was that an elevation taken by yourself at that time?

A Yes, that was taken by myself at that time.

Q Was that before or after pumping that well?

A Well, they were then pumping 14.4 inches, as I testified.

Q At that time what was the depth of the well below the surface of the ~~well~~ ground to the bottom of the well?

A Somewhere in between 300 and 400 feet; I never measured

it exactly.

Q Did you measure it at all?

A I had a 300 feet tape line with me, and let it down in the well, and it didn't strike the bottom, and I had no longer tape and couldn't measure to the bottom.

Q Who was with you on that occasion?

A Mr Stowell and Mr Shepherd I remember were with me; I don't remember any one else; we had Mr Hawkinson but he did not tramp around much; he drove the team the most of the time and remained in the buggy.

Q Did anybody else make a measurement at that time of the depth of the well?

A No, I made the measurements and they watched me do it; and I gave the results of the measurements I think to Mr Stowell; I don't know whether he took down anything else; I did not make a note myself of the measurement of the depth of the well, because I did not reach the bottom; I only made a note of the depth to water.

Q Yes, I think you stated the depth to water was some eighty-odd feet?

A 86 feet to water.

Q You have several times referred to those notes, and in this connection let me see them for a moment; not that I have any doubt that you are correctly giving the notes, but there may be something else in them of concern to us: Where are the notes concerning that well?

A They begin at the words "At 16th St. wells -"

Q What was that that was out of repair?

A The engine: "Engine working at half capacity; out of

repair".

Q About that measurement, you made no note at that time concerning any discoloration on the box did you?.

A I made a note of the old head, which means the same thing. The note is "Old h .2 ft"; that meant up to the discoloration.

Q What sort of a box was that.

A That was a redwood box with the seams caulked with oakum, and coated on the inside with asphaltum or coal-tar, and leading into a flume.

Q How was the box situated with reference to the well-the output of water from the well?

A The box was on one side of the shaft, and the water was raised by the pump, and ran from a trough into the box, and from the box into a flume, over a weir, two feet wide.

Q What were the dimensions of the box?

A I don't know; I didn't measure it; there was nothing except what I have in my notes; I don't remember measuring the dimensions of the box; it was quite a large box.

Q Was it a square box or oblong?

A I don't remember as to that; only I think the box was longer than it was wide; I know it was so large that it made a still pond for the weir; and I made no note of any irregularity inxt e weir; it was a very good weir.

Q The trough discharged into this box from the pump?

A Yes, the pump discharged the water in a trough, and that was notched into the box, and discharged into the box at the upper end.

Q How high above the level of the water in the box did

this trough discharge?

A That discharged partly under the level of the water; the trough was notched down into the side of the box, and the bottom of the trough came in below the surface of the water; there was some back water in the trough.

Q Was that box as much as 18 inches square?

A A great deal more than that; it was many feet wide and many feet long, and quite deep; I can't say now much as I did not take any notes of its size.

Q Returning to the subject of the table at page 3661, were any of those subsequent elevations of water given in that table xx taken by yourself, elevations at well number 3?

A Yes, they were all taken by myself, except the one on August 6, 1900; that was taken by Mr Trask and testified to by him; the one on December 26, 1908, was taken too by Mr Trask and testified to by him; and the one on February 20, 1909, was taken by Mr Trask and testified to by him; all the others were my own.

Q Now, the measurement of February 4, 1900, 1403.25: was that before or after pumping the well?

A The well had been pumped but was not being pumped that day.

Q On August 6, 1900, was the well pumping? The elevation was 1379.6.

A I didn't take that; Mr Trask took that, and I would have to refer to his testimony to state.

Q You don't know whether it was a pumping elevation or not. Well, take the elevations which you yourself took, May 7, 1904, 1348.50: Was that a pumping elevation?

A No, sir; there was no pumping that day.

Q. July 29, 1905, the elevation was 1346.30: Was the well being pumped or had it been recently pumped? Have you the original notes from which those elevations were taken?

A. I have; I can tell whether the well was pumped or not from the measurements of pumped water; July 29, 1905, the well was not pumped or had not been pumped before which that measurement.

Q. Tell us how you ascertain that fact?

A. From the fact that whenever the wells were being pumped and I was there I measured the water at the wells.

Q. Where are your measurements of water at the wells?

A. In the same notes.

Q. Give us the page of the transcript where it appears?

A. Well, in the transcript they appear at the place I was looking, which is page 3967, giving all my measurements of pumped water at these wells.

Mr McKinley, Q. You mean it was not pumping July 29, 1905?

A. Yes, sir, that is what I mean; if it was I would have a measurement of the flow from the well on that date.

Mr Pritt, Q. Is this the page, 3967?

A. That is the page. You will find on that date that there is no measurement of any pumped water from that well on that date; that is in 1905; consequently it was not pumped when I took that observation; if it had been pumped and there was any water flowing over the weir I would have measured it.

Q. Do you know on that, or any of those other occasions, what time had elapsed since the well had been pumped?

A. I simply know from the record in the case, that it had not been pumped since the previous year, the previous irriga-

tin season; I know nothin about that from ersonal knowledge.

Q More than half of your measurements there are after 1900.

A I never measured that well, when it was pumping water, except on March 15, 1899, and November 22, 1908; those are the only dates on which that well was being pumped, when I took the water-levels; all the other times it was not being pumped.

Q It was not being pumped on July 29, 1905, when this elevation of 1346.30 was taken?

A That is correct; there was no pumping.

Q Now, then for the purposes of that table, and the opinions and deductions which you stated with reference to the same, what did you assume to be the elevation of the water at the Cucamonga Springs?

A The elevation at which the flow from the springs is measured, 1285 feet above sea-level.

Q Well, it is measured at the weir number 8, or measuring box, quite a distance below the place where it is taken out of the creek in the 30-inch pipe line isn't it?

A Yes; I didn't mean that; I meant where it is diverted; I know there is a slight fall in that pipe line, which would change that, not materially, but would change it to a small extent, but I mean the point of diversion is the point I refer to as the point of measurement; if that water was not all taken in the pipe line, we would go there and measure the balance in the creek at that point.

Q That point is 1285 feet?

A Yes.

Q At the head of the 30 inch pipe line?

A The diversion from the Creek into the 30 inch pipe line.

Q Then you assume for those purposes that the discharge from the Y tunnel was at the same elevation?

A No, I do not; I assume it was a part of the Cucamonga Springs supply, and at a higher elevation; I did not assume it was the same elevation.

Q You assume that the water was there at the same elevation, 1285 feet?

A No, you misunderstand entirely; I assume it was within the cross section of the escaping water, and not at the same elevation, because that water comes out throughout a large cross section, which varies in elevation, from the lower end to the upper place; it may be likened to the depth of a flume carrying water.

Q Well, it varies - the places where the water appears in the ground, or where it did before it dried up, varied by that extreme, in the direction of the well number 3, and also varied east and west did it not?

A Yes, sir; but it didn't vary down stream; it never came out any lower down stream than that point; but it varied upstream and east and west, depending upon the amount of water coming out there.

Q Well, the water appeared there on both sides of an incline, the lowest part of which was the Cucamonga Stream, the creek?

A The Cucamonga diversion you mean do you not; the diversion from the creek is the lowest part of it.

Q Well, you gave that as 1285 feet?

A But you say in your question Cucamonga Creek; the Cucamonga

Creek is a sloping plane, and you have to select some point on that if you are talking about elevation; and the point I selected was the intake where the water was diverted into the 30 inch pipe line.

Q I probably should not have said "point"; but that creek cuts a notch through the surrounding country there does it not, and the water appeared as shown on this map, exhibit 81 representing the cienegas, and also as you have yourself seen on the ground I presume, the water appeared on the banks, on the slopes, so to speak, of the little valley which was drained by the Creek. Isn't that so?

A Yes, but it never appeared as high as shown on Exhibit 81, during the year 1899 or 1900; that was away back in 1890 that it appeared up high like that.

Q I am inquiring if the water in the cienegas on both sides of the Creek did not appear on the slopes of the elevations both to the east and the west of the creek, at differing levels, varying levels, as you proceeded either east or west of the creek?

A Yes, sir; it came out of the formation, and the lowest point was this diversion, and then it would rise, depending on the quantity of water coming out; if there was much water coming out it would come out higher than if there was little.

Q That is going up the creek?

A Yes, but the variation was only up; it was not down; I took the lowest point at which the water came out for this table. I wish, however, to state, Judge Pritt, that you are in error as to this table being based on that; you are

thinking of another diagram relating to well number 7 when you speak of that; this table is based on level elevations and discharges, and does not take into account anything regarding where the Springs emerge. It was not made on that theory; that is the other diagram and the other table made on that theory.

Q On what theory was this table at page 3861 constructed?

A That was constructed on the theory of Mr Loebig and Mr Purcell that the discharge of the Cucamonga Springs and Y tunnel is regulated by the hydraulic head of the gravel basin above Base Line, and that there should be a correspondence between hydraulic head and the discharges at all times.

Q Do you observe in that table, that excepting November 22, 1908, when the well 3 was pumping, that the lowest discharge of water at Cucamonga Springs corresponds with the lowest elevation of the water in the well number 7, that is, July 29, 1905?

A Yes, sir; I observe that, but that corresponds with the discharge all over the country at that time; the point with me is what is shown in my diagram that - -

Q All over the country?

A - - a like head does not produce a like flow at the Cucamonga Springs; that is the point I make; I claim that in the Summer of 1905 was the lowest waterplane anywhere that I have observed in all parts of this part of the country; also the lowest flow of those springs.

Q You are not asked about the waterplane elsewhere, and for the present there is no means of knowing whether you are right or wrong on that proposition; but it is apparent from

this tabulation, that the lowest discharge shown from the Cucamonga Springs corresponds with the lowest elevation of water in the well number 3, except at a time when the well was being pumped. That is a correct inference from these figures isn't it?

A I do not agree with you, that that is a correct inference, because the fact of pumping the well makes no difference; the hydraulic head must be taken from the cone of depression, and not from the surface of the waterplane elsewhere; and therefore I disagree with your statement that the lowest measurement corresponds to the lowest level of the water plane.

Q Do you mean to say that it is only the water which is in the cone of depression about a well which can afford a hydraulic head for other water in the neighborhood?

A Yes, because the water standing outside of the cone of depression constitutes the hydraulic head which forces the water towards the well when it is pumped, and it cannot do its work but once; and the very reason that the cone of depression forms is because it requires a head to force a sufficient quantity of water towards the well to supply the amount pumped out.

Q Do you mean to say that water exercises its head underground only in one direction?

A Yes, sir; when it is percolating it does, because the head is consumed in friction, and the slope of the cone of depression indicates the angle taken by the water, the head above the lowest point of the cone being consumed in friction.

Q (Drawing diagram on board) I am going to assume that this triangle or triangular figure, ABC, represents a section of a cone of depression formed by extracting water by means of a pump situated directly above it, and that the lines ACD represent the water plane: Are we to understand that the water at and about the point C and below it, can exert no hydraulic pressure in the direction of the point D?

A Yes, sir; if you draw another line - -

Q That is what you mean to say?

A Practically so; I want to explain, however; if we draw a level line, which I dot, E to B, and indicate this cone of depression more correctly, as you have shown it coming to a sharp point,- the real cone of depression comes up on a curve in this manner,- the head at the point where the cone of depression intersects the waterplane is all exerted in forcing water towards the cone of depression, and drawing water from outside, so that head is all consumed in friction down to the level line EB.

Q None of it exerted in any other direction?

A There would be no material amount exerted in any other direction; otherwise the cone of depression would not have to be that deep; the very theory of the cone of depression is that it is deep enough to create a grade to force water to the well when it is pumping.

Q Then if you have the point B as low as the point D of emergence, assuming that the point D is the point where the water by nature emerges from the ground, and the water at point B is low as it is at point D, the water should

entirely cease to flow at point D should it?

A It would cease to flow at that point after pumping any considerable length of time; it would not cease to flow the first day, because it would take some time to set up the motion in the - -

Q Why wouldn't it? If the weight of the water is all exerted in the opposite direction, why wouldn't that flow all cease immediately?

A Because it takes a little time for the motion to be set up. If you draw the plane of the cone of depression in a circle (witness draws diagram on board), with a dot in the center representing the suction of the pump, the water is moving radially towards the well in all directions, and this head (indicating) outside of the cone of depression is all exerted in forcing water towards the well,- the resultant of that head is all exerted in that direction.

Q And the consequences are, in your view, that wherever a point is reached by the cone of depression of a pump well which touches a line horizontal with the flow of water in all the other wells, springs, streams and exposures of water in the neighborhood, they will cease to flow and the water makes a tee line to the well?

A The truth is they would cease flowing if the pumping is in porous gravel like these in 16th - street. If you have it in compact clay, I admit that there is a very different condition. But I am speaking of the very porous gravels on 16th Street.

Q Gravity doesn't have anything to do with it? The pump overcomes the force of gravity which is operating on all the water in the neighborhood?

A You are forgetting the important thing in this problem, and that is, that the well itself extends down for a great depth below the point D, and that most of the water is coming in at points down the pipe. If you will consider that problem you will easily understand that I am correct. Your application would only be to a shallow well without a bored well in it, which is dug a few feet down and the water drawn from the very bottom of that small.

Q I understand that the water in the well comes mostly from above and comes in to the well where it is pumped.

A Then you are wrong, because the fact is that in these deep wells the area is greater in the piped section constituting the well, by deepening the well. That is the object of sinking the deep wells. That is, to have sufficient area surrounding the rim of the cone of depression to force

water into that pipe sufficient to supply a large amount to be pumped. I wouldn't be wrong if I were to state that the cone of depression really has a more marked effect even than I have ascribed to it in extending its influence to the level of the bottom of it. In very deep wells the influence would extend even to a greater distance.

Q. Why should there be a difference if the well is deep or shallow?

A. I can illustrate by showing how the water moves: here is a pipe with slits in it. The water will move into these slits in various ways, being in motion. Water in motion converts its pressure into velocity and friction, and the head is therefore converted into velocity and friction, and cannot be used for forcing the water out of any springs or supplies at any other point except the well.

Q. And the direction in which the water will come differs if the well is deep or shallow?

A. I don't say the direction differs, but the movement of the water plane differs, because the slits are supplied and the water comes up to the pipe and moves as I have illustrated on the blackboard.

Q. Wouldn't it come up to the pipe by means of suction whether the pipe is shallow or deep?

A. It comes to the pipe by means of the head which is pressing on these hypothetical lines I have drawn on the blackboard; and that hypothetical line, considered by itself, would act very much as an inverted siphon, the head being at a point on the water plane--

Q. Do not darken counsel with such a multitude of words.

I ask you whether your well penetrates below the water plane 20 feet or 100 feet, as regards the action of the water--

A Whether it makes a difference?

Q Yes.

A It really does. That is why we bore the deep wells, because we have learned it by experience.

Q Don't you bore the deep wells because there is a greater body of water?

A No, sir; because we have more water and more hydraulic head surrounding the well to force water into it.

Q And there is more water to draw from?

A On account of the surrounding head.

Q Does the water come into the deep wells from any different directions from what it does in a shallow well, assuming that either one of them penetrates into the water plane?

A Not from different directions; I said from different depths. I admit it comes in radially towards the well.

Q We don't need to be instructed that water will come from greater depths in a deep well than a shallow well. I was asking about the direction that the water takes to enter the pipe.

A I still contend that we substantially agree, because horizontally the direction is always towards the pipe or towards the pump.

Q I regret very much that my early education was so much neglected that I am unable to follow you, Mr. Finkle, in the discussion of your formula that you have stated

here, that $M = \frac{Q}{\sqrt{2gH}}$.

A. I might resort to the blackboard and demonstrate the formula.

Q. I do not propose to enter upon that at all. But as I understand from the diagram, map or chart which you produced here to show that inasmuch as hydraulic pressure is exerted proportionately to the square root of the perpendicular distance between two different points,-- that inasmuch as that is the law, you find that there is no correspondence between the head of water in the well no. 7 or Ia skell well and the discharge of water in the Cucamonga Springs. But, if I understand your deductions, and the lines which illustrate them, shown on the diagram (I think it was exhibit Z-1), they mean about this: that the line on exhibit ~~1~~ Z-1, drawn to indicate the discharge from the Y Tunnel and Cucamonga Springs calculated from the hydraulic head would represent the flow of water from those springs and the I Tunnel if that flow conform to the theoretical quantity which should be discharged in applying these formulae. Is that correct?

A. That is correct; yes.

Q. While the lower black line shows the actual discharge of the water from the Cucamonga Springs and the I Tunnel as taken from actual measurements;

A. That is true.

Q. So that it simply amount to this: that the formulae being applied, the actual discharge noted is much less than the theoretical discharge would be, assuming that

there was an unobstructed application or operation of the hydraulic head at well no. 3 upon the water discharging at the Sycamore Springs?

A. No, not unobstructed, but an application of the hydraulic head which is obstructed alike at all times. If it were unobstructed the conditions change and the coefficient K would change.

Q. As I have indicated, my education has been neglected, and yet I perceive that proposition. Now then, in order that we may draw any instructive conclusions or deductions from these circumstances, do you not have to assume that as the water comes down the formations through which it is drawn remain constantly of the same degree of porosity? The pore formation does not change as you descend below toward the center of the earth?

A. We have to assume that there has been no change in the adjustment of the earth strata by excavations or consolidations or anything taking place between the two times when you apply the formulae. The whole theory is built on the assumption that these earth strata are permanent through which the water moves; and having once determined the coefficient of resistance in these earth strata the application of that coefficient continues to apply indefinitely. If there had been any disturbance of the earth strata by artificial movements or from natural causes there is no question at all but that the application of this formula would be wrong, because the coefficient K is based on the experiments as the conditions were at the time when the coefficient was determined.

Q I am not putting my questions here on the theory that there were earthquakes or any other convulsions of nature which changed the strata in the earth during the time covered by these measurements or these calculations or the observations which were made on the flow of the water and the elevation of the water in the well. The question I had in mind was whether or not as the water descends or was lowered at the various points of discharge, in the Cumbonga Springs and in the 7 Tunnel, at the various points of discharge, whether or not there is not a constantly changing condition of porosity through which the water flows, and, consequently, a constant change of the coefficient of resistance.

A If you are assuming that, you are assuming that which is not a fact. Because the only change in the earth when you draw the water down is that of the hydraulic head, which is allowed for by the formula, and you cannot assume that the earth will change its porosity because you have a smaller cross section than if you had a larger cross section, as long as you have the same locality and the same formation, without having any changes by earthquakes or natural causes.

Q You and I are not looking at the same side of the question. I have an idea that may be wrong, that if you would have a condition of affairs which would allow of the application of your formulas here concerning hydraulic pressure with the greatest freedom from disturbing elements, if your water in the pipe was clear water, the movement of which is retarded except by the friction of the sides of the pipe, I suppose the fact that the hydraulic head

is most easily computed under such conditions.

A. I think not. The hydraulic head is computed by us under all conditions. If you take that pipe and fill it with gravel and pass the water through it, we can compute the discharge under the same formula, and you would have an accurate result.

Q. But you would have more resistance.

A. It would make a different coefficient. But having once determined that coefficient for the pipe filled with gravel, it would forever stay that way till you changed the gravel.

Q. Now suppose instead of putting in coarse gravel you put in fine sand?

A. You would have to redetermine the coefficient then.

Q. Suppose as you draw out the water from the water plane in the Cucamonga springs and the Cucamonga stream flow from year to year till they completely dried up: Now then, as the waterplane descends are you not getting a change of porosity of the material through which your hydraulic head is exerted?

A. I cannot conceive of the draining of water out of the soil making a change in its porosity. I never heard that theory advanced. It is new to me entirely.

Q. Can't you conceive that the water will move with less friction if the top of your saturated mass consisted of coarse boulders and gravel than it would in the bottom of the saturated mass which consists of fine sand?

A. Well, if the bottom of the saturated mass consisted of fine sand, and the portion on top consisted of coarse

gravel and boulders, the coefficient would still embrace all of the conditions-- the average of the whole thing.

Q. Now then, when you lower your water plane so that no longer any part comes through your coarse boulders, and get down into your fine sand, does not your coefficient of resistance change?

A. I don't see how the water could come through the fine sand with the gravel and boulders on top.

Q. No, that don't answer the question. You get off into wandering mazes of one kind or another. If you lower the water so that none of it is flowing through coarse boulders, and it is all flowing through your fine sand, the coefficient is changed?

A. If you divert your water through a different kind of material the coefficient of resistance would change.

Q. You don't have to divert it into a different material, but you lower your water plane so that it descends into finer material, and it looks to me, as an individual who is untrained in the business,-- it looks to me as if your water would flow with much less velocity and meet with far greater frictional resistance, and consequently your coefficient would necessarily change, and it would be a constantly changing quantity as you descend from your coarser material to your finer material. Isn't that so?

A. If you can build up an artificial formation such as you describe, in layers, and carry out the experiment of that kind, you would have the result that you describe. But we know that the earth is not built up that way. We know that the entire mass is heterogeneous and that you

don't have layers one over another of coarse and fine the way you describe; and we know also that the water does not move in these layers in the Sacramento springs, and therefore the question you are asking applies merely to a possible experimental demonstration which you might make in a flume or artificially placed materials of your own fancy.

Q You are assuming what you don't know, whether the condition exists there or not. I will ask you to answer the question put to you before this last answer. Please read the question to the witness: (Question read.)

A Yes, sir; on that assumption it is so, but I wish to explain, so that we can understand --

The Court: If you assume his premises the conclusion is right; but you don't assume his premises?

A No; because the water does not move in the fine materials but in the coarse streams. That is the only place the water moves so as to form springs. That is the vice of the whole assumption.

Mr. Britt: Q Suppose you were to invert the conditions and have the finer materials on top, and the water plane is drawn down so that there is a less quantity to flow through, and it flows through the coarser material; You would get accelerated velocity and less resistance, and a changing coefficient again under the different conditions?

A You wouldn't get any changing coefficient in natural soil, because all the water circulates through the coarse strata and the clay and fine sand or silt strata to which you refer are only the surrounding bounding walls of the

circulating veins of water. They don't transmit water by circulation to the springs or cienegas; they merely contain water which is in such fine pores that it does not move or feed springs. You are assuming the water to circulate through the ~~fine~~ fine instead of the coarse, which is not a fact.

Q. What I do assume is that the water plane is lowered--I will ask you whether it is not so that as your water plane is lowered the prism of material, some fine and some coarse, changes or may change its character so that your coefficient of resistance is not constant, but may vary with the different character of the material permeated by the water.

A. No, that is not true, because the water does not travel through the fine material. We know in boring wells that we never obtain water from the fine material.

Q. Suppose you invert the assumption and put the fine material on top, you say your coefficient is an average--say you have three materials, the finest on the bottom and the coarsest on top: when the water comes out of the upper formation it changes the coefficient?

A. It averages up only as to the coarse material. The fine material transmits no water and forms no part of the problem any more than the walls of the pipe do.

I can illustrate this by taking a cement pipe line. The walls of the cement pipe line are saturated with water also, but there is no water traveling through those walls at all, nor do they contribute to the discharge of the pipe. The only water traveling is in the pipe itself. It is exactly like the veins of water. The veins of water are the ones

which carry the water, and the fine material which Judge Britt refers to is merely the bounding surface which bounds the pipe line. It is saturated but it does not carry water.

Q Do you think that I have understood that there is only two classes of material, fine that carries no water, and coarse which carries it all. Do you think I am disposed to present this case on that assumption?

A Your questions seem to indicate that.

Q Don't you know that there are all kinds of materials there of varying degrees of fineness and coarseness?

A Yes; but it averages about the same. You can take any of those water strata, and if you can show me any difference in the average, I have something to learn on that subject.

Q You don't know what the average is there.

A However, a complete answer to that matter would be to say that if you are correct in such an assumption it would be disproved by the fact that the first time when the level of the water reached the same level as it was on a previous date and the springs were not flowing the same. So it can be disproved by the figures in this case without a large amount of trouble or argument.

Q Now the water in the Jacmonds springs rose in a slant for a good many hundreds of yards, did it not?

A Yes; it began at the lower end and rose upward, depending on the quantity of water coming out.

Q Don't it really begin at the upper end and rise downward also?

A. I think not, because if there was none at the lower end there would be none at the upper.

Q. It rose and fell sometimes higher up the stream and sometimes lower down?

A. As the quantity diminished; but as the quantity diminished the upper part would fail and not the lower.

Q. You took for your elevation of the Cucamonga Springs 1365 feet?

A. Yes, sir.

Q. Now what would be the average elevation of that area from which the water emerged in the Cucamonga Springs?

A. I have no means of knowing. That would vary from day to day at the lower end where the water comes out, depending on the quantity of water.

Q. Wouldn't it be something like 1340 feet?

A. I do not undertake to say. If you will fix any point I will be glad to make a diagram based on your point and see if it will corroborate your theory.

Q. The contour lines show approximately, do they not, the elevation of the water at the upper part and the lower part of the so-called Cucamonga Springs?

A. At one time, when they were determined. I would rather have you fix the point than me, because you might object to my judgment and, perhaps, with a good deal of reason.

Q. Suppose you take a point half way between the place of first emergence of water in the Cucamonga Creek below the Base Line at the head of the 30-inch pipe line, which has an elevation of 1365 feet, and you make your calculation of the hydraulic head with reference to such point as

that: it would xxxx show materially different results, wouldn't it?

A. I suppose it would because you would exclude part of the cross section through which the water is moving. It would exclude all the lower part of the cross section and the water below that wouldn't be considered in your calculation.

Q. And so the results would vary according to the elevation you would take of the Dunsmuir springs, from 1285 feet upward to the highest point where the water emerges in the spring?

A. Yes; if you take all if the flow at the lower point; but if you measure the flow at the point where you apply the hydraulic head, I doubt whether you would find any material variation in the results.

Q. The hydraulic head would be accelerated all along?

A. Yes; but it would be accelerated to discharge the lower water, which you wouldn't consider if you moved your point higher than the lowest point of discharge.

Q. The relative quantity of water emerging at other points along, from the elevation of 1285 feet up, is unknown, isn't it?

A. I think it is unknown as far as I am aware. I never made any measurements to determine it.

Q. That is to say, it is unknown whether the bulk of that water comes in 500 feet above the elevation of 1285 feet or whether it comes in 500 feet or only 300 feet?

A. I won't go that far, because in a state of nature it seems to come out with great regularity, so far as you could observe without making measurements.

Q. Suppose you would take this line C-E, the line C-D representing the channel of the creek or the plane at which the water is emerging in the Cuyamaca Springs, and call the point D the head of the 30-inch pipe line, with an elevation of 1250 feet? The result that you obtain by the application of your formula on the exhibit C-1 will vary, will it not, whether or not there is a minimum discharge at the point D or whether the maximum discharge is at the point E?

A. I don't think so, within the limits which I have used in my calculation.

Q. Suppose you protract that line shortly and make a point F and there is no water emerging on the part between D and F: Could you take the elevation at the intake which would be 150 feet lower than at D and apply the same results--

A. You can't apply it below where it emerges.

Q. Then if the water is emerging with different degrees of copiousness at various points between C and D, doesn't that introduce an element which renders the results uncertain?

A. No; not as long as the hydraulic head remains above the highest point where the water is discharged.

Q. Without regard to whether there is one inch coming out at point D, 40 inches at point E and 60 inches at a point intermediate between E and D?

A. Not as long as the hydraulic head is higher than either of those points. If the hydraulic head drops below those points your assumption would be true and there would

a variation; but as long as the hydraulic head is above the discharge, your assumption would be wrong.

Q Suppose that the porosity of the material is such that the water comes down at A and none at D: Can you take the elevation at D and apply your formula here on Exhibit D-1?

A Yes; because as long as the hydraulic head is higher than the point that you call D the pressure at that point is proportionate to the square root of the hydraulic head, regardless whether the head is 120 feet or only 1 foot. Your assumption would only be correct on the theory that your hydraulic head is so low that it is lower than any point where the water is discharged.

Q I am not convinced, but let me ask you another question: Suppose that the porosity of the material through which the water emerges in the Dalemouge springs is such that nine tenths of it will emerge at the point A. Now that is all gone; the water plane is so low that nine tenths is all taken out and there is only 1/10 emerges between the points D and A: Do you still say that you will obtain any reliable or expandable xxxxxx relation (for the purpose of comparison) between the hydraulic head at the elevation of the water in well 7 and the place where only 1/10 of the water is discharging, say at elevation 1350?

A No; because that part of your question which you first state, presumes or assumes that the hydraulic head is lowered below the point where nine tenths of the water discharges. If that is true you are correct, of course, and there would be no pressure to force water out at that point and the law would not xxxlx hold.

Q. Oh, yes; there would still be some pressure, because there is a small portion of the water that is exuding at point D, but most of the springs have been dried up.

If the upper springs have been dried up where the material is so much coarser, that could only be caused by the hydraulic head having been lowered below that point. Undoubtedly such a condition would have occurred. But under my diagram there is no such showing. The hydraulic head on my diagram is far above the places where the springs come out.

Q. But you assume perfect homogeneity all through the saturated prism of earth through which the water circulated or percolated.

A. No, indeed; I have not. I have assumed merely that the formation has not been altered below the point of the hydraulic head. It is the same in well no. 7 as it always was.

Q. But there might be such a condition in the material, where the greater part of the water of the Cucamonga springs would be abstracted or withdrawn by pumping or some other agency above, and only a small fraction of it left to emerge at the head of the 30-inch pipe line.

A. If you are coming to that theory, you are coming to my theory of why these springs have failed, because they divert from the same channels in which the springs rise, and not by the hydraulic head. My theory of the decline of the Cucamonga springs is that the only pumping effect is because it is the same duct or channel from which the springs are coming, and not the hydraulic head-- above e

the 16th Street wells.

Q. You say the hydraulic head was always above the Cucamonga springs or the water in the Y Tunnel?

A. The hydraulic head in well no. 7.

Q. Did it not sometimes sink very much below the bottom of the Y Tunnel?

A. There was water then coming out of the Y Tunnel.

Q. What?

A. I haven't looked into that. I can easily tell you by looking at the level of the Y Tunnel. If you take the date when we were out there on the 15th of March, 1909, the hydraulic head at well no. 7 was about 12 feet lower than the Y Tunnel, and yet the water was flowing out of the Y Tunnel. That of itself would be absolute convincing proof that well no. 7 had nothing to do with the discharge of the Y Tunnel. The Y Tunnel is marked with an elevation of 1364-- yes, the elevation is 1364, and the hydraulic head at well no. 7 was 1373, or 9 feet higher. So I was right in my original statement that the hydraulic head was above the highest emergence of the spring.

Q. What were you saying just now, that something was conclusive?

A. I was talking from Mr. Wright's map exhibit 1. The elevation is 1384, which applies to the granite monument instead of the grade of the Y Tunnel, and the other elevation is the grade elevation--xx 1364-- or 20 feet xxxxx below that.

Mr. Haskell:

Q. Do you withdraw the conclusion?

A. I withdraw that conclusion. It was based on the propo-

sition that if that were true the well would have nothing to do with the discharge.

Mr. Britt: Q. Hasn't your hydraulic head at well no. 7 very often been below the bottom of the Y Tunnel?

A. It has only on three occasions been below the level of the Y Tunnel.

Q. It was always lower--- Only on three occasions? Give us those three occasions.

A. On the 7th of May, 1904.

Q. Where does it appear?

Mr. McKinley: Page 3865.

A. And on July 29, 1905, and November 22, 1908.

Mr. Haskell: Q. Which well are you referring to?

A. Well no. 7-- Oh, I am speaking of well no. 3. Well no. 7 was on other occasions. On four occasions, when well no. 7 was lower than the Y Tunnel.

Mr. McKinley: Those figures that you gave apply to well no. 3?

A. Yes; they related to well no. 3.

The Court: Q. Do you mean now that there were occasions when both the water level in 3 and 7 were lower than the outlet of the springs?

A. Not the outlet of the springs, but the floor of the Y Tunnel.

Mr. Britt: Q. The water in the Hellman well no. 2 at the head of the west branch of the Y Tunnel, whenever it was not flowing into the Y Tunnel, followed along your hydraulic ~~xxxx~~ head, didn't it?

A. No, sir; it was sometimes below the level of well no. 7

and sometimes above it.

Q. Yes, you said that this morning. That is, the hydraulic head corresponded with the elevation of the water which, when it attained an elevation of 1[illegible] or [illegible] or [illegible] feet, emerged in the I Tunnel.

A. 64 or over. I don't know just what the level is, but you can tell from the tabulations. But as I explained this morning there was no relation between Xx well no. 7 and Hellman well no. 2.

Q. I will come to that later on. Don't worry about that. We will have a little conversation about that later on. That is the extent of what I have to say on the question of $K = \frac{Q}{\sqrt{2gh}}$. You stated that the first time you were at the 16th Street well was on the 14th of January, 1899, and at that time you measured the water to the depth of 73.1 feet. Did you at that time measure the depth of the well? You told us you did not on the 15th of [illegible] of the same year.

A. No, I didn't measure the depth of the well at any time, because I never had a tape line long enough to reach the bottom.

Q. For what purposes were you employed by the San Antonio Water Company connected with that well? I refer now to any digging or excavation of it.

A. The only employment was this: In the summer of '98 the San Antonio Water Company made an arrangement with me whereby they consulted me on their various water developments, and it was not till January, 1899, that they

called my attention to this well. They had in the mean time a good many other developments that they were making, and those supplies I had examined and reported on and consulted with them on.

Q. But you never saw the well until January 14, 1899?

A. I never saw the well until that date. That was my first visit to the well.

Q. And it was then three or four hundred feet deep?

A. Yes, sir; there was a 9 or 10-inch pipe in the bottom of the shaft that was stated to me to be 300 or 400 feet in depth; I never determined the depth, as I stated, as I never had a tape line long enough to reach the bottom.

Q. Were you present at any time afterwards when the well was being deepened?

A. I was.

Q. When time?

A. That was going on while we were preparing the McPherson case.

Q. Give me the dates. You have notes of it, haven't you?

A. I have no special notes except on the dates when I measured the depth of water in the well. But I was at the well every time I was there.

Q. Was any work going on for the purpose of deepening it on March 15, 1899?

A. No, sir; it commenced after that time. It commenced either in the latter part of 1899 or the early part of 1900; I won't be positive as to that.

Q. Have you made any note anywhere in your books of any time that you were present when the excavation and deep-

ening of that well was going forward?

A. I made no specific note in relation to the excavation that I have found, but I might fix you the date correctly in regard to its deepening. I know it was accomplished early in 1900.

Q. You were not superintending the sinking of the well?

A. No; not in charge of the construction; I was merely the consulting engineer of the company on these water developments and recommended the enlarging and deepening of the well.

Q. Can you state the occasion that you were present on the ground during the time the deepening was in progress?

A. I am not sure that I can give you the dates on account of not having made copious notes on those things; but I might refresh my recollection from some other things. As near as I can remember, the well had been deepened prior to February, 1900, because I made no measurements of that well from March 15, 1899, and February 4, 1900, although I was there several times; and the recollection I have is that they were working on the well and I couldn't get an observation of the depth to water. The date I am unable to fix any more accurately than that.

Q. And you haven't any note of any observation made at that time at all?

A. Not on that well; I have on other wells, but not on that well, and I presume, to the best of my recollection, they were working on the well. That is the reason for it

Q. What observations have you on those other 16th Street

wells during that time?

A. The Haskell wells, I have observations on December, 1899.

Q. Are those in evidence?

A. They are in evidence. They are all in evidence; and I have some in April and some in August, the 25th, 1899, etc. on the Haskell well. I remember one on December 13, 1899, which is in evidence, and in August, 1899, I think there is one in evidence.

Q. Through 1899 there are only two of those wells owned by the San Antonio Water Company--

A. At that time there were only two. There were some shafts on the Haskell place, but no wells except the one that was bored in November, 1899, which is our well no. 7 at the present time.

Q. You have no note of any kind of any observations of any nature at well no. 5 from March 15, 1899, until some time in February, 1900?

A. I have not. No written memorandum.

Q. You state that the first observation made on the Haskell well was December 13, 1899.

A. No; April 1st, 1899. I made an error in stating that. Afterwards, in looking over the notes, I ran across this observation of April 1st, 1899.

Q. That was the observation of April 1st, 1899?

A. 60.4 feet to water.

Q. It was a shaft?

A. Yes, sir.

Q. Not pumped?

A It hadn't been ~~xxxxx~~ bored and was not bored till the following November.

Q At that time it wasn't pumped-- that shaft?

A It was pumped at intervals in 1899, but I don't think it was pumped on April 1st. It wasn't pumped till later that year.

Q It might have been pumped earlier than that?

A I couldn't say as to that.

Q On March 15, 1899, you examined what was called here the Courvine shaft, and found 180.6 feet depth and 1.4 feet of water in the bottom?

A March 15?

Q Yes. I read from the testimony at page 3007.

A That is the way my notes read. 180.6 feet, and 1.4 feet of water.

Q Did you keep a series of measurements on that shaft afterwards?

A Yes; I did; I testified to several; one before this date and some since.

Q Have you given the result of all the observations made on that shaft?

A I think so.

Q Have you made any recently?

A No; I haven't seen that shaft since the McPherson suit was tried. I don't know whether it is caved in or what has become of it.

Q I think the location of that shaft is shown on defendants' exhibit D. I want to ask you one or two questions about it. Is that shaft to which you refer-- that

hole in the ground-- the shaft which is called the Courwine shaft on the map orplat defendants' exhibit 2--

A No; that is not the one, I can tell you that. I have been at that shaft too, but the one I spoke of is indicated by the Courwine shaft and a square drawn at section 5, which is on a line between the land of the Ontario Power Company and the Ontario Colony Lands. Those ought to be distinguished. There are two Courwine ~~xxxx~~ shafts, and the one I have been talking about is just on the west line of the Ontario Power Company's land.

-0-

Here the Court takes a recess until to-morrow, April 7, 1909, at 10 o'clock a. m.

--------ooOoo--------

J. W. McKinley

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co et al Plaintiff vs. San Antonio Water Co et al Defendant	April 7, 1937 Vol. 47

Index

F. C. Finkle, Cross Examn, 4194

I. BENJAMIN, Official Reporter

Wednesday, Apr. 7, 1909. Forty-seventh day.

--0--

F. C. FINNEY.

Cross Examination resumed.

The Witness: I have those references to the transcript on the points that you inquired about yesterday.

I find in regard to 1901 that that is also in the transcript at other places, for instance at page 3418, at page 2716 by different witnesses;

Then for 1902 I find at page 2716, in Mr. Trask's testimony and some parts of it at page 2899, given by Mr. Shepherd in which he produced reports from Sanders. That is for 1902.

Mr. Britt: Q. Aside from Sanders' reports, what else?

A Mr. Trask on page 2716. Then for 1903, I find at page 512 of the transcript of the testimony the measurements given by Mr. Trask under date of June 25, 1903.

Q Any others for that year?

A Not for that year. I find in 1901 the matter is again put in in another form by Mr. Leake at page 335, when he cites a report by Mosby on four wells that were pumped.

Q That Trask record is June 25, 1903, no. 8 pumping 91.2 inches?

A There is another one there, you will notice, in regard to another well also.

Q No. 3?

A 60.8 inches. That's it.

A At the time of adjournment yesterday evening I was in-

inquiring of you about the Bourwine shaft, so-called, as marked on defendants exhibit D, and you remarked that there were two shafts similarly marked, one not far from the Bodenhamer Tunnel and the other in section 5 close to the lands marked Ontario Power Company on the map. Those however, I believe were alike in this , were they not, Mr. Finkle: That when you observed them first they were both dry or a little water in one of them?

A There was water in one, and then I never observed the other one till a few years ago, and it was then dry. I don't know what it was originally.

Q Now, asking your attention to Defendants' Exhibit 29, which you state contains certain lines indicating water contours, those water contours are marked at one hundred feet intervals are they?

A Yes.

Q Now, the 1100 feet interval and the 1200 feet interval on that map, or call them contours, the 1100 feet contour and the 1200 feet contour are indicated as passing through the lower part of the Red Hill are they?

A The 1100 feet contour is dotted and is only hypothetical; the solid ones are the only ones which pretend to be from observation- oh, the 1100 feet contour is a real contour; yes, sir.

Q And so is the 1200 feet?

A Yes, sir.

Q They are pretty close together?

A They are.

Q And indicative of some sort of barrier having the effect

to back the water up?

A No, sir; they are indicitave of rapids, of a rapid velocity; of water having escaped and passing with a rapid velocity, like the water in a stream.

Q Don't they show a steepening of the water contour?

A Yes, a steep waterplane, which has a free movement, the same as the rapids in a stream.

Q You think that where that is indicated through the Red Hill it indicates a more rapid movement there?

A Wherever the contours are close together, it indicates a steep grade and a rapid movement of water.

Q And wherever they are far apart they indicate a slow movement of the water, or a flat waterplane?

A They indicate a flat waterplane; flatter waterplane in proportion to the distance they are apart.

Q And a slow movement of the water?

A Yes, sir; either a slow movement, or a movement under pressure, escaping against great resistence.

Q Those Sourwine shafts to which your attention was directed, being dry when you observed them, shared in that particular the characteristic of that Jordan well, on the south side of the Red Hills?

A Yes, at the time that they were dry, not then being ~~int~~ extended deep enough to intercept the waterplane.

Q What in your opinion was the cause of the dryness of that Jordan well?

A It was not deep enough to reach the waterplane at that point.

Q Why, there are plenty of wells a little way above that did reach the water plane.

A Well, that is above the Red Hill formation, or in the Red Hill formation, there there is great resistance, but the Jordan well is down below in the recent gravels, and there is no resistance below that point and the water falls rapidly there.

Q But for the resistance afforded by the Red Hills above there would be water in the Jordan well?

A No; if the Red Hills were south of the Jordan well, there would be a resistanace; but as the well is south of the Red Hills, and the water comes from the north, the moment the water passes out of the influence of the Red Hills, it drops down conformably to the coarse deposit at that point.

Q Because there is a barrier behind it, back of the Jordan well?

A Yes, north of the Jordan well.

Q That is what you attribute it to?

A No, that has nothing to do with the level of the water in the Jordan well; the loose formation below the Jordan well, and at the Jordan well is what causes that; a barrier above cannot influence the standing water at that point. It must be below in order to raise the water; the same as a dam in a stream raises the water above the dam, and has no effect on it below.

Q If there was a barrier below the Jordan well you would expect to find the water rising there?

A Yes, sir.

Q And you say that the fact that there is a barrier keeping the water back from it, has nothing to do with the

fact that a considerable depth was penetrated without reaching water?

A Not the fact of the barrier above it, because the barrier or dam would not affect the water below it.

Q The water in the region above the dam is higher than the water below?

A Yes, sir; that is the condition we have here, the same as a dam in a stream; north of the Jordan well where the dam occurs the water is higher; this being below, the dam has no influence on the condition.

Q Doesn't it have anything to do with the relative elevation of the water above and below the dam?

A No, sir; no more than the water in the stream; in the stream the water is caused to back up above the dam.

Q You don't think the barrier has anything to do with the elevation of the water below?

A It does above, but not below; after the water has passed over the dam it resumes its ordinary level.

Q How about a submerged dam?

A In a stream?

Q Yes?

A Well, the same thing.

Q Well, a submerged dam in anything where you intercept percolating water underground?

A It has the same lack of influence below a submerged dam.

The Court, Q If you put a dam in a stream, there will be a time necessarily where the dam influences the water below until the water gets to flowing over the dam and assumes

the normal flow?

A I was referring to a dam which was not impounding water and depriving the stream of water; I was speaking of a dam that had existed for a long time, like that one.

Q A dam does tend to impede the flow of water for a time until the water accumulates in the basin or reservoir back of it, sufficient to overflow the dike or dam?

A Yes, until the reservoir is filled. It would be proper to qualify my answer in that regard; ofcourse in giving all of those answrs, I referred to a condition of uniform flow over the dam, the reservoir having already been filled.

Mr Britt, Q You take a submerged dam across a prism of earth and material in which water is percolating with more or less velocity, will not the submerged dam have the effect to raise the water behind it, and to lower it below?

A It will while the reservoir or basin above the submerged dam is filling, because it will then cut off the supply below; as soon as the reservoir or pocket is filled as suggested by Judge Oster, the water would then flow over the submerged dam, and it would resume the same level below as it was formerly without the dam being there.

Q Well, if the water is abstracted above the dam it never will fill will it, if it is taken out in the same volume as supplied?

A If the water were all abstrated above the dam and the submerged dam were tight, and there were no outlets through it, then ofcourse the stream would be dry below; but that condition would not apply here, because we know that this Red Hill dike or dam ends at some point west of

the Red Hill here further north, and below that point it is so low, that the water escapes around it, and supplies that formation - -

Q. That is what you say: You don't know it.

A. We do know it.

Q. You have your 16th street wells, at which you find the water at 60 and a fraction feet below the surface - that is so isn't it?

A. Well, at some times it might have been that low; it has varied with the seasons.

Q. Don't you know when they first put down the shafts, didn't you hear Mr Trask testify that the water was 61 or 62 feet ~~xxxxx~~from the surface?

A. In some of the shafts, and it was 55 I think in some, and in some it was 60 and some odd feet, further south, and by taking the slope of the waterplane - -

Q. I am not asking you about the slope of the waterplane; you say that Mr Trask testified that it was only 30 feet to the water level in any of the 16th street wells?

A. Thirty and a fraction; 30 or 40; I can give you that; I have notes of his testimony.

Q. All right, refer to it if you can do it quickly.

A. I think I can do it quickly; I made some abstracts of it here.

Mr Mashell: You are referring to his testimony in 1900, when he went back ten years later, and found a well so many feet deep, and no testimony as to whether it had caved in or not.

A I am referring to Mr Trask's experimental shafts in 1900;

he speaks of experimental shaft number 4, in 1890, which was the southerly one, as I remember it, marked 4 on Defendants' Exhibit D.

Mr Britt, Q Called 4 here; they were not numbered the same when originally made his observations.

A I know there is some confusion of numbers.

Q What is that (Indicating)

A That is experimental shaft number 3 up near the debris cone; at experimental shaft number 4 the water plane was 1410.5; and in well number 3, which is 2000 feet from experimental shaft number 4, and is 3000 feet north of the Sourwine shaft; or in a straight line 600 feet north of experimental shaft number 4, the water plane was 33.7 feet higher, according to Mr Trask's testimony.

Mr Haskell: He testified that those wells were sunk approximately in 1890, and that his remembrance was that it was 60 feet to water in one of them; then he referred to his notes and in his testimony corrected it in this way; that in 1900, about 11 years after the wells were dug, he measured the depth in one, and found no water, approximately where you say it is, without any testimony whether they had been filled with sand or caved in in the mean time.

Mr Britt: Mr Haskell states substantially as I remember the testimony, and that the water elevations in the 16th street wells was approximately the same.

A No; in the MacPherson testimony, Mr Trask gave his statements and he mixed up the numbers, but he went back and corrected it after consulting his notes.

Q I am not talking about the testimony in the MacPherson

case; I am talking about this case.

A It was all read into the record, that part of the testimony; it was read in by you.

Mr Haskell: It was read in the way I say, ten years afterwards.

A I did not so read it; the construction that I placed on Mr Trask's testimony is as I stated.

The Court: We are discussing here as to what the testimony shows; I suppose it will speak for itself in that regard.

A As I understand it, there was 38.7 feet difference between the water level at well number 3, and experimental shaft number 4, when they were first dug; and that slope was in a distance of 600 feet due south.

Q Well, now the Sourwine well was 180 feet wasn't it ?

A The water was about 184 feet as I remember it below the surface.

Q What was the cause of the great difference in the elevation of the water in the Sourwine well, and the water in those above?

A Well, you will find that the slope is very much the same; the greater distance between makes up that difference. I made a calculation on that point to determine it, and I see that it varies almost nothing from Mr Trask's finding in those two shafts, seeming to indicate a uniform slope to the southwest.

Q You made a computation and found almost nothing - what?

A Almost no variation in the slope of the waterplane from Mr Trask's testimony, as to the two upper ones, extending the plane southerly, that it would intersect practically

the water plane as it originally was in the Sourwine shaft, only a few feet variation; I have that computation here if you wish it.

Q No, I don't wantthe computation; I only want in this instance your explanation of the fact if there is any, that the water-plane was so much higher at the 16th street wells, than it was at the bottom of the Sourwine shaft, although the surface of the ground shows no such difference in elevation.

A You wish my explanation for that?

Q Yes, sir?

A The explanation for that is this: That the Red Hill fold has a low place, between the Sycamore tunnel cienega and the Red Hills, which may have been caused by an inequality in the original uplift, or it may have been eroded by the San Antonio Canyon which is a large watershed, and that over that gap has been filled in the recent coarse material which we see there, and that there is no barrier at that point, and as soon as we pass west of the Red Hill influence, the waterplane conforming to that condition drops off to the south very rapidly; that is the explanation.

Q If the barrier continues to the west from the Red Hills would it not have the effect to raise the water plane behind it?

A It would then raise the water-plane to the west of the 16th street wells, north of the barrier; in other words, if the Red Hills instead of dipping down or pinching out, extended on to the top, then the water in passing west of the

Red Hill and north of that extension, would be raised the same as it is now, on the north of the present Red Hills.

Q What causes the water to accumulate over there in the angle of Red Hill, as depicted, or what is represented as an angle, on this Exhibit P,- ofcourse we don't admit there is any.

A Whatdo you mean? In the change of formation there?

Q No, I am speaking about the water, where it appears in the 16th street wells and did appear in the Cucamonga Springs, before the 16th street wells were bored.

A Those are two different things and I will have to explain one at a time; the 16th street well water is raised there by reason of the Red Hills forming a dam below; and that water through the recent gravels has to find its es-. cape to the southwest, as it can't run over the top of the hills, and the resistance to the southwest is too low to force those waters over the top of the Red Hills.

Now, as to the part of your question in relation to the cienegas, they are simply the outcrops, caused by the fracturing of the formation of the fold in the ancient alluvium.

Q We have heard your views.

A You had both your conditions in your question and I had to differentiate.

Q You say that the water there is deflected to the southwest. Why does the water appear there at all instead of running directly down to what you have photographed and called here the outlet of the gravel basin?

A I think you can easily understand that when you consider that the feed of the water is from the north, northeast and northwest; and being from the north, the trend of it is to the south, and it continues to travel south until it strikes against this barrier formed by the Red Hill, and when it strikes the barrier it backs it up in the gravels, and then it finds its easiest outlet, which is to the southwest.

Q Look here in exhibit F. Why do you say that the trend of the water is from the north when it is perfectly obvious to all from all of the exhibits and observations on the ground that the emergence of the water is to the northwest of the 16th Street wells?

A You are assuming that the Cucamonga Canyon is the only supply to those wells, which is not correct.

Q Didn't you say it was the most important?

A Yes, sir; but it is only part of the supply.

Q Doesn't it supply far the greater amount of water?

A I will have to look at my figures to tell you that. The supply is 364 inches. In both alluviums it is 704. It would be about half.

Q Of that 704 you get 160 from the San Antonio Canyon?

A 160.5 inches; I did.

Q And added that to what? 360?

A Yes, sir.

Q That would give you 520, wouldn't it?

A 524.7. That is the total San Antonio and Cucamonga Canyon supplys.

Q All right.

A That is, to both alluviums.

Q And it comes from the north-- northwest?

A North and northwest. Cucamonga Canyon is north of the 16th Street wells

Q Well, it is rather west of north.

A Well, it is so slight that you can hardly figure it that way. It is practically north.

Q Do you mean to say now that the water from the Cucamonga Canyon-- the main body of it-- comes directly down there to the 16th Street wells?

A No; what I mean is that the water from the Cucamonga Canyon itself crosses some to the northeast, some to south directly and some to the southwest.

Mr. McKinley: Q Do you mean northeast?

A Some to the southeast, some to the south and some to the southwest.

The Court: Q When you say Cucamonga Canyon is practically north, do you mean the main canyon?

A I mean the mouth of the canyon, the Cucamonga Canyon, is practically north of 16th Street well no. 1. Taking the mouth of the canyon it is almost due north. It may vary a trifle.

Q. Howwith relation to the Haskell wells?

A. From the Haskell wells it is northwest. The Haskell wells are in the corner of the basin.

Q. I think Judge Britt's question was addressed to the entire group of wells. Speaking of the canyon being north, so far as the purposes of this case, the mouth of the canyon where the water discharges is what we are concerned with.

A. That is what regulates it.

Mr. Britt: Q. Look at these contours on Map Exhibit F: Don't they show that the formation there has a dip and trend from the mouth of the canyon to the southeast-- in a southeasterly direction?

A. Part of the way; and part of the way southwesterly. You notice the contours curve and the water would flow to the contours. It is really more of a southwesterly dip than a southeasterly dip on the debris cone.

Q. Then it would result from your theory that the most of that water ~~[illegible]~~ appearing at the 1st Street wells comes from the Bay Canyon and the Deer Canyon?

A. I think not. The theory that I have had and also expressed here and believe~~min~~ is that all of the waters of these canyons are emptied into a neutral belt in the foot hills which may be a mile or a half a mile wide, and that they intermingle and travel in a general southerly direction, separating and feeding both alluviums. I think the contours show about the way they travel, and also the hydrographic contours on exhibit Z-9 of defendants , and Intervenors exhibit No. 2 both show that they travel as

I testify

Q The water appearing there in the Red Hills, 16th Street wells on the north side of the Red Hills, is in your judgment derived from those several watersheds in the proportions you have just now stated, is it?

A Yes.

Q 160 from San Antonio Canyon?

A Not the 16th Street wells. That is the total supply to the whole Red Hill district, the artesian as well as the surface water. If you want to segregate them. I am unable to segregate how much of the amounts I have testified to are tributary to the artesian waters and how much is tributary to the surface waters.

Q I am rather surprised at that. But, however, you may take your seat. You made an observation of what is called the Chinese well at the cienegas ~~and~~ on the lands of the Cucamonga Land and Irrigation Company, on February 4, 1900. Refer to that for a moment, if you please.

A Yes; I have the notes here.

Q You found 23.4 feet from the surface to water, as I understand your testimony. Is that correct?

A Yes; that is correct.

Q Did you make any further observations of that well at any time afterwards?

A None except those Mr. Trask testified to. He gave his levels on that well and I was with him on certain dates when he made the observations, and they were the same as mine.

Q Have you notes of them?

A I have notes of them; yes.

Q Have you them before you there?

A Do you wish the notes?

Q Yes.

A Recently that well has caved in and some of the observations could not be taken; but I have notes of some years. Taking the year 1904 there is a measurement already testified to by Mr. Trask on date of May 7, 1904, when it was 66 feet to waterin that well.

Q What was that date?

A That was May 7, 1904.

Q Was there any note of any pumping at that time? Or whether there was any pump in the well?

A I have no note in the book here regarding that. I know that well was pumped; but I have no note whether the pump was there still or had been taken up.

Q What other measurement have you touching that well.?

A The next visit I made there was on July 29, 1905, and as I find no note regarding the Chinamen's well, I presume it had caved in before that time. I remember Mr. Trask an I went there and found the well caved in.

Q What was it? A shaft?

A Yes; it was a shaft on top; whether there was a pipe in the bottom or not I can't state.

Q Have you any other notes of the Chinese well? between February 4, 1900, and this date in 1904?

A I will examine my notes. I find no note on my visit of September 19, 1907, which was the next visit I made there

Q The question was about dates between 1900 and 1904.

A I wasn't there from the close of the Emerson trial in 1900 till May 7, 1904. I misunderstood your question. I thought you meant subsequent dates.

Q Did you ever at anyntime measure the water pumped from thatbwell?

A I never did. The Chinamen were using it in such a way that I couldn't measure it when I was there. They were irrigating with it.

Q You testified about a certain Stewart well in the Ontario Colony; here is that situated, Mr. Finkle?

A The Stewart well was on Fourth Street 1100 feet west of Mountain Avenue. On Exhibit D you will find Fourth Street, and you will find Mountain Avenue, and 1100 feet from the intersection of those two would be the location of that well.

Q That is, 1100 feet west of Mountain Avenue?

A I believe that is what the notes state; yes, sir. 1100 feet west of Mountain Avenue.

Q Suppose you make a dot there and mark it Stewart well?

A I haven't any note of the side of the street-- Oh, yes; it is on the south side of the street. The point where I make the dot and write "Stewart Well" in pencil.

Q 296 feet to water?

A 296 feet from the surface of the ground to water.

Q Where was the King well which is also measured in the same connection?

A That is 1000 feet west of A street-- no, it is on A Street 1000 feet west of Mountain Avenue.

Q Can you indicate about the locality on this map, exhibit D?

A I don't see A street marked on this map, and I will have to have some assistance from someone who can locate A Street. That must be one of the town streets. Mr. Trask would know.

Q All right. I believe that in answer to a question by the Court you stated your definition of an artesian well was one in which the water rises anywhere above the point where it is intercepted in the boring or digging of the well.

A I am sorry to say that you misquote me. I don't say that. I said it was a well in which the water would rise above the surface water in the ground where the well was bored.

Q Above the sources of water that are struck in the course of sinking the well?

A Yes; you strike the surface water first, which is not under pressure; then you proceed down and have another stratum and you have a rise above that surface water, and we classify that as an artesian well.

Q May not the surface water be under pressure?

A I never saw it that way; never saw a place with surface water under pressure.

Q Not on the surface of the ground, but the surface water that you strike, may be under pressure?

A I don't know where it has happened; there might be such a condition constructed or such a condition in existence somewhere, but I never saw one like it.

The Court: I suppose an artesian well presupposes a head and pressure back above the surface water?

A Yes, sir; that is the definition; having a differnt source from the surface water

Mr. Britt: xSo that an artes an well according to your definition is simply a well in which the water rises above -- rises in the shaft or in the pipe-- above the point where it stood when it was first struck?

A No, it is not the same water--

Q I am not asking you whether it is the same water or not.

A Your question implies that and I don't want to say yes to that because it is not-- There are two different kinds of water: the first encountered surface water which is under no pressure ; then you penetrate an impervious barrier and you strike water, and if it rises higher, it is artesian.

Q Your original definition has to be modified, does it, by the further condition that you penetrate a stratum which confines the artesian water?

A I think that was all in my original definition.

Q Then it is all right. Your definition is no definition because it involves the application of the term we are trying to define. I want to know what you mean by artesian water, and if you say it means a well in which you strike artesian water, I am not enlightened.

A The word artesian itself means nothing; it is an imported word from France --

Q I don't care about the etymology of the term, but what you mean by the word "artesian" as you have used it in this case.

A I will state it again so that there may be no mistake: If

you begin in sinking a well and you first encounter surface water which is free water percolating in the soil, and you then proceed down and tap some other water which rises higher than that in your pipe, I would class it as artesian water. And the condition of penetrating a stratum is of course necessary to create that condition. Without an impervious stratum you can't have that condition. Water could not be under pressure without it is under an impervious stratum.

Mr. Stevens: You stated that the water rises higher than that: What did you mean by that?

A Higher than the surface water which you first encounter in the same soil.

Mr. Britt: Q And unless it does so rise you wouldn't have artesian water?

A I wouldn't so consider it because there would be no way to identify it.

Q Unless it rises that way your well penetrates no artesian strata?

A I would consider that I had no evidence of it. If it did the head would have to be under the surface water head.

Q Suppose at the depth of 60 feet you encounter the first water bearing stratum, according to your views here, and that never rises in the well. Now you proceed below that 100 feet through dry material which yields no water, and thereupon you strike another stratum of water bearing material, and the water in that should rise 90 feet above

the place where you struck it, but that would be 10 feet below the first original water bearing stratum: You would say then that there was no artesian water in that well.?

A That is, 10 feet below, you say?

Q I am saying the second stratum of water bearing material is 100 feet below the first, and the water from that rises 90 feet, which is, however, 10 feet short of the first stratum intercepted: Would you say then that there is no artesian water in that well?

A That second stratum on the hypothetical assumption might be considered artesian water; but I don't see how you could determine the rise. I never saw a well in which that could be done, because the surface water follows you down and is part of your well, and if your water doesn't rise above it, how can you determine?

Q I should say it could be done by pumping. If you pump from 65 feet below the ground you would get nothing but the surface water; if you put it down 100 feet you might draw from the artesian stratum below.

A I don't see how that could be; the two waters could mingle.

Q If your surface water, however, furnished a very slight supply, and you were getting a very great supply at that point or depth, wouldn't you know that you were drawing from a stratum that was tapped below the surface ~~of the~~ water and was rising in the well?

A Not by any means, because water will rise to its head, and if you are in surface water all the way down in the well, your supply will increase as you deepen it, ow-

ing to the greater area. You know that water will have to rise to its head or surface level.

Q Let's see; probably we can get at it . The term "artesian" has been used here, and there are some conditions which really do not exist. I will try to get before you what I have in mind. Suppose you strike first a stratum of water at a depth of 60 feet which, when your well is pumped like some of these shafts-- the Haskell shaft and the shaft ,say, the 16th Street well-- will yield a flow of 15 inches. Now then, you sink your well 100 feet deeper and you go through dry material till you get down 100 feet deeper, at which time you come to another water bearing stratum the water from which rises in the ground, we will say, 90 feet, but which does not come within 10 feet of t the original first discovered water bearing stratum. Now, if you put your pump down to a depth of 65 feet and, instead of getting 15 inches out of the first stratum, you get 75 inches, wouldn't you know then that you were getting 60 inches of water from a stratum beneath the first?

A Your question presupposes an impossibility, because if you strike water under a less hydraulic head than the upper water, you would get less water, because the upper water, being heavier,-- it would draw off part of your surface water and you would get less water.

Q May be the well would have to be sunk deeper. But if you sink it till you get into water which is coming from the second stratum, and instead of 15 inches you get 75 inches, don't you know that you are getting water then

from a source which is far more prolific than that first penetrated?

A No, sir; you have simply demonstrated that by putting in a longer cylinder in your well that you have a larger area from which to draw, and you have more slits in your pipe and you draw more water. But in your assumption in the previous question, if you strike a stratum under a lower head than the first one, that stratum instead of benefitting your well would deplete it. The higher water would come in and fill the lower--

The Court: I would like to ask whether in ~~spite of~~ your hypothetical question you said 60 inches: Do you mean for a short time that you draw the 15 inches?

Mr. Britt: I mean until you demonstrate that you draw the 15 inches and that that is asmuch as the stratum will furnish.

The Court: Without any lowering of the well?

Mr. Britt: Yes; without any lowering of the well; when you pump it sufficiently to demonstrate that 15 inches is what the stratum will supply.

A The difficulty is that the deeper supply would be under 10 feet less head than the upper water, and by physical forces it would abstract from the upper water.

The Court: The question in my mind is, assuming that you are tapping surface water, whether it is possible to keep up a supply of 15 inches. Wouldn't they invariably fall down?

Mr. Britt: You might not get 15 inches if it was all that it yielded at first; but you would get down to a point

where the well would yield a constant flow, and I used the figure 15 for the purpose of a rough approximation to the actual conditions.

A I can illustrate that by assuming that this pencil is a well, and the top of the pencil is the plane of saturation. If at first you bore the well only one-third of the length of the pencil you could only have a plane that deep from which to draw and you would only have that much area for the water to get in. But if you sink the well deeper, to the full length of the pencil, you have a deeper plane and a larger area for the water to come in, and you obtain a larger supply, although it is all surface water.

Mr. Britt: Q But I assumed that between the first stratum and the second stratum there is dry material or impervious material between the two.

A That has nothing to do with it; that might be an island lozenge, and it would have to be for the conditions of your question, and therefore it couldn't be a barrier which confines the water.

Q Well now, let's see. I am going to suppose that this dotted line is the surface of the ground. We will suppose that this solid line, the first one, represents a stratum of material which supplies water. That is what you would call surface water. We will suppose that the second solid line represents the next stratum of water bearing material.

A What do you have between them?

A I have an impervious material.

A What do you mean by that? Do you mean ordinary clay

which does not transmit water.?

A I mean such material as will produce artesian conditions.upon a water plane situated beneath it, when that water plane is tapped by a well penetrating it.

A That is, you mean not impervious absolutely, but clay or fine silt through which water would not circulate but which would hold water within its interstices, in a quiescent state?

Q I suppose water is scarcely ever quiescent; it has some movement. Suppose from the surface of the ground a well is put down represented by the two parallel lines and the well driller finds a stratum and he pumps that and finds that it produces 15 inches of water.

A How deep below the plane?

Q Call it 60 feet. Although that might necessitate, for the purposes of the question that I have put to you, putting that line further down if we are going to make it 100,-- but call that 60 feet. And he finds that that stratum or what you call surface water, will yield 15 inches when pumped. He wants more water and he runs it down through this material until he strikes the second stratum of water. Let us suppose that that stratum of water has a head here to the left. Now, sir, if this water at the second stratum consists of water which is under pressure, it will rise in the well, won't it?

A How high do you assume that it rises?

Q Well, it rises.

A I want to know to what point you are assuming that it will rise.

Q Will it rise?

A Certainly, if it is under pressure. But how high do you assume that it will rise,

Q If it rises-- You say it will rise if it is under pressure?

A Most assuredly.

Q Will that be artesian water under your definition?

A Not unless it rises above the surface water, because you have no way of determining whether it does rise or not. If it rises lower than that-- assuming that it rises to a point 10 feet below there, these water supplies are connected at some point near the mountains, and if that were true, the effect of striking the lower stratum would simply drain off the upper and lower your whole water plane. The balancing of forces would necessarily do that.

Q They are not necessarily connected.

Mr. McKinley: The question is do you say that would be artesian water if it rises.

A I say no man on earth knows whether it rises or not.

Q Suppose it rises to within 10 feet of where the head is Would you say it is artesian water? It might be that one set of experiments would prove it and another would not.

A It might be called an artesian well in a certain sense.

The Court: What sense do you use it in?

A What well borers experience, and the records; not any theoretical play of words as to being under pressure or not.

Mr. Britt: Q I didn't use any play of words. If the

water rises to 10 feet below the original water bearing stratum which was 60 feet below the surface, it would be artesian, according to your definition?

A Yes; but it wouldn't add to your well; it would deplete your well.

Q You say it couldn't possibly be determined. We have assumed that the well borer striking the first water bearing stratum has got 15 inches of water. Now suppose that he drops his well down 20 feet to a point which we will mark in that manner, and at that point he gets 50 inches. Does he not know, having penetrated this stratum of impervious material, that he is drawing water which is artesian in its character, following your definition?

A Not at all, and I will tell you why he doesn't know it. Because when he has gone down that additional depth he has the advantage of the pressure of that whole water plane to force water into the well; he has also the advantage of a longer cylinder in his well with perforations in it through which this water can enter the well in larger quantities. And it demonstrates absolutely nothing in regard to artesian water.

Q If he has taken all the water, he knows that his first stratum only furnishes 15 inches?

A He is only taking to the head that he penetrates to.

Q How can there be any more head? You say there is no head at all to surface water?

A You don't seem to understand the proposition.

Q But I understand that.

A There is a head after you get below the surface. There

is no head right on the surface.

Q Is that what you meant to tell me a while ago when I asked you about surface water and you said there was no head?

A I said there was no head forcing the water through the ground except the slope of the surface of the water plane.

Q Now we are talking about something different.

A. You strike that surface water plane at this point and there is a zero head. There is no water superimposed above it except the slope of the water plane. But if you go down with the bore five feet, you have five feet head and you pump into water that deep. If you go 10 feet you have that much more head above your well; if you go down 100 feet you can still pump more water because then you have 100 feet head helping you force water into the cylinder, and it is forced in from all parts, and it is forced in by reason of the water plane.

Q You darken counsel with a multitude of words. How can he increase that if it only has 15 inches of water, if he drops it a thousand feet?

A You are ignoring the conditions of the ground.

Q No; you are inventing conditions. You know that if he could only get 15 inches out of his original stratum he couldn't increase that any if he dropped his well any distance.

A Not till heincreases his head. Now I am going to make a diagram which will make it clear. Take this as the sur-

in an hand right by the machine.

Q. At what work you would be able to stable the plan? What would you about motions rather and you will water not be land?

A. I will then see to need forming the water through the process making the signs of the machine of the water plant.

Q. Then we are talking about something different.

A. The engine and machine water plant at this point has been in a dry hard. There is no water supplemental above it except the engine of the water plant. But if you go down with the rate time that, you have time that hard and you pump into water that deep. If you go to 40 feet you can find much more hard above. Pump well; if you go down 10 feet you will pump more water because then you have 10 feet hard adding the water like the spigot, and is as travel to from all parts, and is as travel in by means of the water plant.

Q. The depth mounted more a maintenance work. The can be increase that if by only the is under of water, it be deep drop transmit level?

A. You are depending the conditions of ground.

Q. Yes; you are investigating conditions. The same that if is still only the is below and if the original surface be and's increase this may if we dropped the well by diameter.

A. Not till increasing it more. But I am trying to make a shallow water well more it water. Then this as the mar-

face of the water plane, and say that the well borer's record shows that passing down 5 feet he develops 15 inches of water by reason of the cone of depression which is formed, and the water is forced into that cone of depression. At that point the well borer records clay for 10 feet, which would be a lozenge of clay that we find in the surface soil at all points. Then below that he entered into another stratum of 10 feet in depth of water bearing gravel as the well borers classify it. Here you have 25 feet. This lozenge is only a local condition which the well borer finds in his well; and when he taps this water it is only part of the same water surrounding the lozenge, and in pursuing the well he perforates it in both formations, and you have the additional advantage of length of cylinder as well as additional head. Therefore your supply is increased, and you are still drawing from the same place. That is a surface well.

Q I don't see that your illustration touches the question on top, sides or bottom, but probably you do. Here is the practical application : You have assumed here that the 16th Street wells are nowhere artesian and differentiated them from the Hellman well no. 2 and other wells which you have asserted to be artesian. Now don't you base that theory on the assumption that there is no artesian water in those 16th Street wells because it don't rise above the 30 or 50 or 60 feet where the water was first found in those experimental shafts by Mr. Trask?

A I based it on that and on the further assumption that the material through which the well passed is mostly

coarse, and on the further assumption that the water had risen, but rising from a lower depth than the surface water that it would have depleted the well instead of helping it; but as the well was helped and became a better well by boring deeper, that the explanation that I have given, its all being one body of water and not an artesian condition, is the true one. If you could strike artesian water at a lower head it would have the effect of draining off part of the original water that you struck, the same as if you lay a pipe line under ten feet pressure through a reservoir which has 20 feet of water standing above the pipe line: If you bore a hole in the pipe line, instead of adding to the water it will deplete it.

The Court:

Q You say the 16th street wells are not artesian: Do you include also the Haskell well?

A The only well that I know of my personal knowledge is Haskell well no. 1 and 16th Street well no. 3. Those were bored when I was connected with the company and I remember I made observations and I know that those are not artesian. The others I only know from what witnesses state.

Q The assumption that you make here for the purposes of the case is that none of them are artesian?

A I say that none of them are artesian from what information I have. With the exception of those two which I have stated, I know nothing of my personal knowledge.

Mr. Britt: Q Suppose that in sinking well no. 3 that surface water, as you call it, was encountered in 64 feet. That is, water in a plane of that nature. Suppose that in sinking that well on down, we will say to 200 feet, that the

well borer encountered a water bearing stratum in which the water lay between different strata of material shaped something like this line that I have drawn here. The water would rise in that well to thepoint where the well intercepts the dotted line, would it not?

A It would, that being the head of the source.

Q Now then, that stratum continues on into that region where there is what you call an intermingling of the old alluvium and the new alluvium. Might not the same head feed an artesian well which feeds the Lady Tunnel?

A Not if the water rises to different levels. In the assumption you have made, Judge Britt--

Q Not if it rises to a different level . But if you don't know to what level it rises in the 16th Street wells, then how can you tell whether they rise to the same level?

A But you do know if you exercise your knowledge or mind. Assuming what you have drawn in this last figure, the water rises lower than the surface water. Now you have perforated the separation between the two by means of this bore. The result will therefore be that this being a lower head, instead of adding to the water supply, it will take from it, the same as if this is an open reservoir and you lay a pipe through the reservoir under less pressure than in the reservoir. The moment you would bore a hole in the pipe the upper head would exercise its force and discharge more water through the pipe

Q You think that the water would run from a 20 inch hole from one stratum to another?

A It would run on the outside of the pipe, the same as

will never accomplishing a worthwhile activity in their
lifetime. Only between different stages of maturity dropped
everything else time just 2 days from here. The major
motivation to work will be impending where the well-
wishes for better time, would be next.

2. It would, just feeling the best of the months.

3. The time, that simply indicates we like that region
where there is what you call an interrupting of the air
activity and the wet climate. Well, my dear, next
time the situation will which there the day Tuesday.

4. Not if you were going to difficult levels. Is the
accomplishment you have made, Judge Dirin--

5. Yes if it rains to a different level. But if you don't
know the mathematical is going to be into simpler ratio, then
take one you will whether they plan to the same level!

6. Then you do have if you exercise your knowledge or what.
I meaning when you have spent in your last figure, the
major plans lower than the moderate value. But you must
performance the impossible balance the by means of
this here. The result will surprise be then this being a
great week, instead of adding to the main merely, it
will make from it. The more at this is to give prior-
ity and you say a step through the primary motor less
pressure than in the remarks. The month you will have
to do in the plan the major load multi exercise the first
and mentioning with major through the plan

7. The least not the major result you for a of two days
from now divided by number.

8. It would cut the depth of the plan, the more at

we see in artesian wells which we attempt to cap, that they do come to the surface in spite of all efforts to cap t them.

Q You think a 10-inch hole through one stratum of water-bearing material is going to drain out all the water in that widely extended mass of material?

A If there is an unbalanced head in it it would do that very thing, because it would excavate the soil on the outside of that very pipe--

Q How much time would it require?

A Not very may months. Being a difference in heads, it would be very perceptible.

Q It is at any rate perfectly obvious that there might be water rising in the no. 3 well or in that no. 7 well rising 100, 200, 300, 400, feet from the bottom of those wells toward the top, and yet you wouldn't know whether it should be classed as artesian water or some other kind?

A In regard to well no. 1 and 7, I know that is not the case, because there was no decrease in the water in those wells after they were bored. Instead of that, it was an increase. And if your condition would have applied there would have been a decrease of water in the wells when completed to their final depth. As to the other wells, I am not able to testify. If the lower water is under a less head than the upper water it will give less water, because the balancing of forces will adjust themselves, and you cannot stop it by artificial means; and in this case

where you are working with the force of gravity, it would be impossible to stop it. In the case of a rising artesian well you can stop it, because you have the assistance of gravity, and by putting cement and obstructions around your pipe you can stop it partially; but in this case you cannot, and the lower stratum would deplete your well and drain it and destroy it.

Q And the more water is put in the less you get?

A The more vacua in them the more depletion.

Q Where would it come from?

A Drain it into the lower strata which are under a lower head. That is so evident in mathematics and physics as to need no explanation. A ssuming a reservoir which obtains its feed of water from a pipe under the surface of it called A. Assuming that there is another pipe passing through this reservoir which receives its ~~water~~ head from a point 20 feet lower down, marked B. There is a difference of level between the hydraulic or hydrostatic conditions of 20 feet. The result would be that the pipe under the lower head passing through this body would drain that reservoir till it was drained down to the point B. That is what I mean, and I think that is capable, of demonstration mathematically.

Q Take your illustration of water which is not mixed with gravel or any other material which resists the flow, and you have this sort of an arrangement,-- if you put your pump down and pump from your body of water at the top and penetrate the body of water at the bottom, couldn't you get more water from the two than you did from the one?

A No, you would not. Because you are putting more head on your pipe B, and its discharge at the lower end would get away from you in spite of your pump.

Q Where would it go to?

A To the outlet of the strata. The strata all have outlets.

Q But do you think this vast mass of material through which water moves with difficulty and slowly would escape more rapidly than you take it up?

A If you have more head on it. You would be worse off than if you didn't encounter the stratum.

The Court: We have often heard of knocking the bottom out of a well. Is that the result of this condition?

A In limestone regions, yes. I have had experience in Wisconsin and Texas and we have knocked the bottom out of wells by knocking the bottom out of ~~xxxx~~ veins in lower strata.

The Court: That has happened in this county.

A I don't know of any cases.

Mr. Britt: That is, where you drop your pipe into a cave?

A No; you will find in those veins illustrations of what you have described here; when you tap the higher one under a higher head and tap a lower one under a lower head, you lose the water, because it percolates down.

The Court: I know of a case that was reported to me some years ago when the Riverside Water Company put a well down out here. They got a nice flow of water and then drove a little further and lost all they had.

A It is probable that the very condition we are discuss-

ing is responsible; but from personal knowledge I don't know of it and didn't investigate it. The whole matter is one which resolves itself into a mere matter of balancing hydraulic heads or forces; and unless you strike a stratum which has more pressure than the one you first struck you can't increase your supply. If you strike ~~xxx~~ a less pressure, you actually deplete and lose your water supply.

Mr. Stevens: Q Supposing the illustration Mr. Britt first gave you of 15 inches developed here at 60 feet; then suppose you go through this dry stratum until you reach a depth of 100 feet and then you pump and you have only 20 inches. You are still in dry material. Then you drop down 6 inches into your water bearing stratum and you get 50 inches of water. Would you say there is not artesian water there?

A Yes, sir; and I would explain it in this way: All the time you were not able to pump more than 15 inches, you would be in a lozenge of clay through which water cannot circulate and in clay in which water is in static contact instead of circulatory contact. When you get to the point where you assume the 50 inches coming into that, you come down through that lozenge and get back into the body of gravel connected with the upper surface water, and by reason of the large head--

Q But I am not assuming any connection. I am having an impervious stratum which goes up to the hills.

A Then I want you to complete your hypothesis. How high does that rise in your well if you don't pump at all in your second stratum?

Q It rises up to the other water, we will say.

A Then you have disproved the hypothesis of your own question. You have shown that the two are in contact.

Q Then don't have it rise as far, but rise within 10 feet of the bottom of the other.

A Then you get into the hole Judge Britt was in and drain the stratum.

Q I haven't seen that he was in any holes. I have seen some holes that some people got into, but Mr. Britt wasn't in them.

A Well, it works according to a fixed law of gravity which you can't set at defiance.

Q If the water only rose this far, certainly you cannot say that the pressure from above had anything to do with it if there was no connection.

A There would be connection. You perforated the intervening layer with the pipe.

Q But I have only increased it six inches more.

A No; you don't understand the problem. Permit me to explain this to you.

Mr. Haskell: It is Mr. Stevens' problem.

A He now has a problem where he first strikes water at a given level; he passes through an absolutely separating impervious blanket and he strikes artesian water at a level which will rise, but not to the level of the surface water. In the mean time he has bored down through that blanket which distinguished and separated the two supplies. And the higher level of his original surface water level under the pull of gravity would cause that to travel along the

outside of the pipe and escape partially through this lower stratum which has not sufficient head to balance it, and instead of gaining water in his well he would lose water.

The Court: Do you see it, Mr. Stevens?

Mr. Stevens: No; I do not. Suppose that we gained 65 inches of water by putting it through this 6 inches more. Do you say that that wouldn't be formed of an artesian flow?

A If you say that it would rise only to a point lower than your surface--

Mr. Haskell: He said to the same level.

A Then he would show that the two supplies were the same and that this was merely a local lozenge.

Q Suppose it was a coincidence that it appeared at the same level?

A You would have to prove your case.

Q I am asking you where the 65 inches of water would come from.

A From the superimposed head being a greater head and this being a lozenge surrounded by porous gravel--

Q But I am not having any lozenge; I am having an impervious stratum miles in extent.

A You have to have a lozenge to fulfill your conditions. I wish to take Mr. Stevens on his continuous blanket proposition for a moment. If he says that by a peculiar coincidence his blanket happened to draw from a source which would precisely coincide with the water plane,-- of course, such a thing might happen-- and he perforates down through that blanket which is universal in extent, the moment

he has perforated down through there he has then made a connection between his upper gravel stratum and his lower, and his conditions would be just the same as if it were a lozenge. It would be an artificial lozenge then instead of a natural one

Q You would say if you got 65 inches of water more when you went through this six inches it gives no evidence of w water coming from some other source?

A Yes; it only shows you have more head superimposed on your pipe; and whether the lozenge is natural or artificial is immaterial.

Q You think the 6 inches additional head may give that much additional water?

A You wouldn't have six inches; you would have the whole pressure of the difference in level of the two water planes. Your question implies that and you can't escape it.

Mr. Haskell: Now, Mr. Finkle, we will suppose that that is the water plane and ~~this space at or near the bottom or below~~ thatbthere is placed at or near or below the surface of that a centrifugal pump which has the power and capacity, when the water is furnished, of supplying 100 inches. It is put into operation and sinks the water plane 30 feet from the top of the water plane to the lowest point of depression. And we will assume that a body of water struck in the lowest water plane that has been referred to through the absolutely impervious stratum will rise, we will say, 20 feet only above the cone of depression. ~~Would you say then that that was not artesian~~

[illegible]

[illegible]

[illegible]

water although the pump was found to still pump 100 inches and could only pump 25 inches before the well was sunk below the last strata?

A I certainly would, because that rise might be due--

Q But suppose--

The Court: Let the witness have a chance, Mr. Haskell.

A If you assume that there is a rise of 20 feet in the water after you strike your lower stratum, that would in my judgment only prove that having a greater depth and perforations and openings in the bottom of your cylinder through which the water may enter, the higher superimposed head due to this original water plane and the greater area in the cylinder would create a greater supply and fill more rapidly the vacuum created by suction in your pipe.

Q Would you still make the same answer if this blanket of clay extended to the top of the Red Hill and to the foot of the mountains without a hole in it?

A Not if the water would rise from that blanket as high as the surface of the ground; but if it would rise to a lower point, 10 feet, instead of increasing your water you would deplete it.

Q I am not asking that. The question does not involve depleting it. The question is if it supplies a greater amount.

A If it supplies a greater amount it would show either that the head of the stratum struck below would rise higher than the surface water, or at least to the surface water. If you are assuming anything different, state it,

and I will try to answer

Q The question is this: If there is an absolutely hermetically sealed blanket such as you put over this ancient alluvium when you sunk it below the sea and then afterwards raised it without a hole in it, extending from the crest of the Red Hill absolutely to within a half a mile or a mile from the foot of the range, and still, if you penetrate down below that the water would rise 20 feet below the suction limit, and by operating the pump you got 100 inches whereas before you perforated this crust you only got 25 inches, would you still say there is no artesian flow?

A I certainly would, Mr. Haskell, in describing the geological formation of the Red Hill section I stated that the veins of water which travel through it all had outlets except those which were dead veins, and the dead veins or pockets which have no outlets anywhere would not supply any water except for a moment. Now the veins of water which are in the ancient alluvium all have outlets -- some in the cienegas at the Red Hill section and some lower down near the Santa Ana River and into the Chino artesian basin, and we don't know where, -- but every one of those veins which supply any water when they are developed has an outlet. If they have no outlet they are a mere pocket of water and would be exhausted at once. So your question assumes an impossibility in that regard. You have to base your question on the testimony which I have given that the water is obtained from live

flowing veins which have an inlet and an outlet, and not those dead pockets which may be cut off and either lack an outlet or an inlet.

Mr. Britt: Q Calling your attention to this well no. 3, you stated that when you first saw it, the first time you saw it was January 14, 1899,-- it was then three or four hundred feet deep and that you were not ~~present~~, when it was deepened afterwards in 1899 or 1900, in charge of the construction. That the well had been deepened prior to 1900 and that you made no measurements from March 15, 1899, to February 4, 1900, although you were there several times, and that your recollection was that they were working on the well and you couldn't get an observation to the depth of water. How then are you able to come here and say that you have personal knowledge that there was no artesian water in the well?

A Because I made an observation after the well was completed.

Q What did you find?

A I found that the water hadn't raised any higher than the surface water.

Q That is the ground upon which you assert that there was no artesian water in the well?

A That and the material which I saw taken out of the well when it was drilled.

Q You haven't any log of the well?

A I have a copy of it.

Q Where did you get it and who furnished it?

A From the well borers' log given to the San Antonio Water

Company; the same kind of a copy Mr. Trask has.

Q Do you know why that log has not been produced here?

A I understand--

Q Do you know?

A Only from hearsay.

Q You are not asked for that.

A I will give you the copy; it is a correct copy of the log which was made by the well borer. The original has been destroyed, so far as I am told.

Q Do you mean to say that from his alleged-to-be-log of that well placed in your possession that you are able to declare that you have personal knowledge that there was no artesian condition in the water appearing in a well 600 or 700 feet deep?

A You misunderstand me. I was at the well several times when it was drilled and saw the material brought out, and on that basis and on the basis of the water in the well not rising above the surface water,-- on those two facts which I know personally,-- I conclude that the well was not an artesian well.

Q But you said that you had personal knowledge.

A That is the personal knowledge; I have given you the facts.

Q That is the ground on which you assert personal knowledge?

A That is the ground; yes.

Q How long after you saw the material which came out of the well was it before you received the copy of the log or alleged log of the well?

A The first copy I received was in 1904, I think; I am quite sure it was.

Q At the time you were employed to make preparation to testify in this case?

A It was at that time.

Q Now how many times did you see the material come out of that well? Remember, you told us yesterday you have no notes of the time you were there.

A I have notes of some of the time

The Court: Do you mean literally? Do you mean how many times he saw it coming out?

Mr. Britt: Yes,

A I can't give you all of the times; I can give you some of them; because I didn't make notes except when I made water measurements. When I made water measurements I made notes.

Q You remember that you stated here that you couldn't get an observation of the depth to water from March 15, 1899, to February 4, 1900.

A Well, when a well rig is working you can't get an observation of the depth to water. They are pumping out with the sand pump and disturbing conditions.

Q I am not asking you about that. I am asking merely about thefact of observation.. I want to get the ground on which you asserted that you had personal knowledge that there was no artesian condition in this well. I asked you to specify the times you were there and you made the answer--

A "I am not sure that I can give you the dates on account

Q. Do you think you were subject to some pressures to testify in this case?

A. It was at times.

Q. Did they ever threaten to use the material from one of your water boxes, you said be prosecuting you for the crime of blue flame you were there.

A. Those words of some of our time.

The Court: Do you mean literally do you remember exactly what he said or nothing such?

Mr. Kunin: Yes.

A. I don't give you all of the flames; I have given you some of them; because I don't know how exactly what I have written down. Then I don't write everyone.

Q. You remember that you stated that you saw the gas observation of the engine in water tank about 12, 1969, in May 4, 1970.

A. Well, when a well is in the working pit and in operation of the engine in water. They are running for the most part the observation.

Q. I am not asking you about that. I am asking about a new method of observation. I want to ask you question which you answered that you saw personal knowledge that there was no external conditions in this way. I asked you to specify the times you were there and you made the answer—

A. I am not sure but I know when you the first to begin 1

of not having made copious notes of those things, but I might refresh my recollection by some other things. As near as I can remember the well had been deepened prior to February, 1900, because I made no measurements of that well from March 15, 1899, to February 4, 1900, although I was there several times; and the recollection I have is that they were working on this well and I couldn't get an observation of the depth of the water."

If you have anything more definite than that as to the times when you visited the well, you are requested to produce it.

A I can't give you all the times, because I made no notes unless I made water measurements; and when I was there in December, 1899, I know I was at that well, and when I was there in February, 1900, and possibly in some other months in which I didn't make any water measurements,-- but I know at least two dates that I was there while they were boring the well: one was December 13, 1899, and the other was, I think, the day before they completed the well,-- possibly the 3rd of February; but as to the 3rd I couldn't get a measurement; on the 4th I did. I was there at other times but I can't give you the dates, because I have no notes on which to base it.

Q Do you know the length of time the well was in process of being re-drilled?

A I do not.

Q The material which you saw extracted from ~~there~~ the well on those occasions would be an extremely small fraction of the whole amount taken out?

A All the material taken out was left on the dump and I was there shortly before the well was completed and saw practically all the material that came out, as they dumped the sand pump on one side and it was all there.

Q I have now the ground upon which you assert personal knowledge of how the water acted in that well, as to no. 3. I now desire the same thing as to no. 7, or Haskell well. What time did you first personally observe any drilling or boring going on at the haskell well?

A I can't give you the dates. I made no notes of the dates.

Q Was it a shaft when you first saw it?

A It was a shaft when I first saw it. I remember examining the shaft going down the ladder.

Q Some time in 1899?

A I think it was in April, 1899. I will look up the notes. Yes, April 1st, 1899, was the first time I saw the Haskell well.

Q It was then a shaft?

A It was then a shaft.

Q And we know between that time and the next February it was sunk to be a deep well, because in February, 1900, it was shown that it was pumped and produced a large body of water.

A It was completed in December, 1899.

Q Have you any notes which would indicate the times when you were present on the ground there?

A Noneother than August 25.

Q Read the note you have of August 25.

A I don't mean that was the only date, but that was the

first note after April 1st. On August 25 I have no notes. I was there and they were working on the well and I didn't get any measurement of the depth to water. Mr. Wright was with me and we both went by the well and saw it.

Q What did you see?

A They had a well rig there.

Q When did you next make observation?

A The next observation was December 13, 1899.

Q The well must have been pretty nearly completed then.

A It was completed just before that. The next observation of depth to water was December 13, 1899, and the well was then completed.

Q What is your note at that time?

A In Haskell shaft 61 feet to water from curb, about level with ground.

Q That is all, is it?

A That is all on that subject.

Q And those are the observations upon which you have predicated the assertion that you know personally that that Haskell well no. 7 showed no artesian conditions?

A Those and the observation of the material which I saw in the shaft and brought from the well when it was drilled.

Q The shaft was only about 60 feet deep.

A It was over 60 feet deep. I think I have the depth in one of these books.

Q All right; state it.

A I haven't the depth of the shaft; I simply have the depth to water. I didn't take the depth of the shaft. The

Q. Have you ever been in a fight or had a boxing match?

A. Yes, I have been in a fight.

Q. Tell us about it.

A. I was in a fight with a man who was drinking and I had to fight him because he was drunk and was trying to take my money away from me. He was a big man and I was a little man. I had to fight to defend myself. So, I fought and he fell on the floor and I took my money and ran away.

Q. Have you been arrested?

A. Yes, I have been arrested.

Q. What for?

A. For not observing the Sunday in 1947.

Q. The only observation was Sunday in 1947.

A. The only observation was Sunday in 1947.

Q. The only man have been greatly injured then.

A. It was impossible for me to have been. The day's business of the 8th of April is which was December 12, 1947, and the only was that happened.

Q. What is your work at that time?

A. Industrial work. All that is what I was work with crowd.

Q. That is all, is it?

A. That is all my lord sayest.

Q. Witness are the observations upon which you base your testimony the knowledge that you have personally this case handle well so. I mean to explain conditions.

A. I know and the observations of the relevant which I see in the court and brought here. He will show it and explain.

Q. The court was only found of this day.

A. In not error of this day. I think I have the legal is and of those basis.

Q. All right, where is.

A. I mean in regard of the court; I simply have the basis to write. I simply have to follow the path. The

depth to water ranges from 61 feet to 69.4 feet at different dates up to the 4th of February, 1900.

Q That is what you call surface water?

A The well is all surface water. There was no rise above the surface water after the drilled well was completed.

Q You have no knowledge of the elevations to which the water from the successive water bearing strata in that well rose, however, except that they didn't rise above the 60-some-odd feet which you measured at that time?

A Also that I think I have sufficient knowledge to state that it didn't rise to a lower level than the surface water, as the well improved after its construction.

Q They rose just exactly to the surface level, did they?

A They were all in contact with the surface water. That is the conclusion I reached from my knowledge of the well.

Q These are the several data upon which you found the assertion that to your personal knowledge the well showed no artesian conditions?

A Upon the data which I have stated and the fact that the well improved as it went down.

Here the Court takes a recess until two o'clock p. m.

---p---

depth in water ranging from 25 feet to 50.4 feet at different dates up to the date of inspection, 1902.

That is what you call shallow water.

The well is all muddy now. Then one can see clear above the surface water after the drilled well was completed.

I can tell by knowledge of the elevation to which the water from the successive water bearing strata is lost well runs, however, except that they didn't rise above the 25-mile-out level which you measured on that line.

Also this I know: there artesian knowledge is this: that it didn't rise to a first level when the surface water, so the well improved after the shooting.

Deep rose just exactly to the surface level, did they?

They even did in contact with the surface water.

That is the conclusion I reached from my knowledge of the well.

Have you the general data upon which you based the assertion that by your personal knowledge the well showed no artesian availment?

Upon the data which I have stated was the fact that the well improved as it went down.

Then the Court have a recess until two o'clock p. m.

AFTERNOON SESSION:-

Mr. Britt: Q Upon what part of the testimony of Dillman do you predicate the assertion that the Upland Water Company well, the Sourwine well at the Sourwine place, pumped by the Upland Water Company, was or is an artesian well?

A On the log of that well as testified to by Mr. Dillman.

Q Can't you state the page?

A Not without I have time to look for it. I can give it to you to-morrow morning.

Q I would like to know what the testimony is.

A I have a copy of the log which shows the same things; but if you want the page I will give it to you to-morrow.

Q Have you a copy of the log other than as it appears in the evidence?

A I took it down -- not his words, but as he stated it, showing at a certain point a rise of water.

Q All right; we would like to know where it is. When was the diversion of the Ioamosa colony from the Cucamonga Canyon increased?

A The first increase that I observed was the construction of the tunnel for diverting the underflow.

Q In what year?

A That tunnel was constructed somewheres about between '87 and '97, but I can't give the year.

Q Don't you know it was constructed in '89 or '90?

A I understand so, but from personal knowledge I don't know. The first time I ever saw the tunnel was in '97, and it was not there in '87 or '8 when I was in that canyon.

AFTERNOON SESSION:-

Mr. Avlis: Upon what grounds do you maintain at [illegible] in the proceeding the assertion that the Social Credit Group will, the Government will be the Social Credit Group, by the Liberal Group, who are in no situation with?

A. In the legend of Aya with an invitation to Mr. Williams. Shall I be added the page?

Q. Not at once I have time to look for it. I can give it to you tomorrow morning.

A. I will like to know what the meaning is.

Q. I have a copy of the log which gives the name [illegible] but if you want the page I will give it to you tomorrow.

Q. Have you a copy of the log which does not is figure in the evidence?

A. I have it here -- my son has [illegible], but at [illegible] is, standing as a certain point a view of water.

Q. All right, we would like to have it.

Also the [illegible] of the Lamoure [illegible] Expedition Fleurs Internationale.

A. The last Lamoure book [illegible] the [illegible] of the [illegible] [illegible] the [illegible].

Q. In what year?

A. This [illegible] was [illegible] [illegible] '27 and '28, but I can't give the year.

Q. Don't you know it was [illegible] in '27 or '28?

A. I [illegible], but [illegible] I don't know. The [illegible] I was [illegible] in '27, but it was [illegible] in '28 or '29 [illegible]

Q You heard the testimony of Mr. Trask?

A That is all the information that I have; the testimony in the record that it was about 1890.

Q The tunnel has been increased or extended in its quality or capacity for diverting the water since that time, has it?

A Not that I know of, limiting that reply to the tunnel and not to the other words of the company.

Q Would you say also that there had been an increase of water diverted by means of the San Antonio tunnel in the San Antonio Canyon?

A Yes.

Q What time did that occur?

A They kept extending the tunnel up to '93 and '4 that I know of, and they may have done some work since that I don't know of. But I had nothing to do with the tunnel after '94

Q A great many things might have happened that you don't know of.

A I suppose there are. I am only telling you those that I do know of.

Q Why do you mention what you don't know?

A I say up to '94 I am familiar with the tunnel's being extended; after that I don't know.

Q What do you know of the extension of the San Antonio Tunnel up to '94?

A In '92, '3 and '4 I went over that tunnel. I was consulted at various times in regard to some matters connected with it, and they were working on the tunnel, not

Q: Do people ever confuse you?

A: Yes, in all the movies I've been in, the majority in the reality that is the about 1111.

Q: The survival rate of your performers is considered to be quite a capacity for diversity the major plays that time, for 1?

A: Not that I know of, limiting that reply to the United States or at least to the times which of the company.

Q: Would you say also that there has been an increase or major attempt by media at the in the latter half of the 80s a notable factor?

A: Yes.

Q: What time did that start?

A: They kept [illegible] the mention of my in '89 and '90 that I have [illegible], and they may have been [illegible] that I don't know at. But I was trying to [illegible] the [illegible] active '94.

Q: A great many things about [illegible] have [illegible] know of.

A: I figure that's, I'm only telling you those that I do know of.

Q: Why do you [illegible] your [illegible]?

A: I say so in '94 I am finding my [illegible] [illegible]; after that I don't know.

Q: Did the job hurt the [illegible] of the [illegible] [illegible] in '90?

A: In '90, I was '4 I mean, [illegible] I was [illegible] at various times to [illegible] [illegible]

only extending it, but were paving the bottom so as to save the water that was sinking int the floor of the tunnel.

Q At what time did you observe that?

A I have given the years,

Q You have given a range of three years.

A I gave all those years.

Q Have you any notes of it?

A I suppose so, but not here.

Q Do you know to what extent the tunnel was extended ~~xxxxx~~ those years?

A No; they ran crosscuts and extended it and paved the floor of it with cement.

Q How far did they extend the tunnel in '92, '3 and '4?

A I can't tell you that from recollection.

Q You don't know the numberof crosscuts or the extent of the crosscuts.

A No; I do not, at this time.

Q Notwithstanding the indefiniteness of your information, you think those operations tended to diminish the flow of water at the Cucamonga Springs?

A I know they did, because they were operations which materially increased the diversion.

Q What do you call a material increase of the diversion?

A A material increase of diversion I would call where tunnels are extended to bedrock, where the floor is paved so that no loss would occur in thegravel below.

Q Now on that proposition you have got 160 inches of water coming from the San Antonio Canyon to feed the Cu-

camonga Springs or that district. In what part of the Cucamonga Red Hill District do you think that 160 inches of water performs its function of replenishing the water plane?

A In the western part.

Q As where?

A Referring to exhibit P, I would say that it would be very valuable in replenishing the recent alluvium which supplies the 16th Street wells, and also the ancient alluvium which supplies the Eady Tunnel wells. I think it would have some effect in replenishing the ancient alluvium on the east side, but to a much less degree than on the west side.

Q Why to a less degree?

A Because the ~~Red Hill~~ red lines drawn on exhibit P--

Q Those red lines don't count for anything.

A They do when you apply them to scientific laws and facts.

Q All right. If red lines govern the matter, go ahead.

A The red lines between which are 117°30' at the mouth of the San Antonio Canyon are drawn to conform to the probable swing of the flow from San Antonio Canyon in all the ~~changes~~ ages during which the deposit of both ancient andrecent alluviums was made, and that line progresses to a point just north of the Lone Star Tunnel on its extreme limit; and it is not improbable that some of those ~~tun-~~ chan nels had existed in the swing of that channel which supplies a limited amount of water to that locality. However, ~~as the probabilities are that the greater part of the period~~

[illegible] voltage is not distinct. It was years ago, [illegible] [illegible] [illegible]

when this stream was flowing and building up the valley, it flowed more in the center of the two red lines which mark the extreme limits, I state as a scientific conclusion of my own that most of the replenishment from San Antonio Canyon is unquestionably tributary to the west side.

Q That means by the same sort of replenishment as the 360-odd inches from the Cucamonga Canyon?

A It is the same thing; it is natural replenishment without artificial interference.

Q And it is the ordinary flow?

A It is the mean of the 38-year record of rainfall which we have as a guide in making these computations.

Q What I had in mind was the composition of the 704 inches of water or thereabouts (I think it was 704) which you stated this morning to be the average quantity furnished from the various sources of supply to the Red Hill District. Do I state that with substantial correctness?

A I have the figures before me. From San Antonio Creek, 160.5 inches.

Q And how much from the Cucamonga?

A 364.2 inches.

Q And if convenient, give Deer Canyon and Day Canyon.

A Deer Canyon, 155.2 inches; Day Canyon, 24.1 inches. It is understood that the decimals are merely the result of computations by plotting certain angles and not intended to show it as closely as that.

Q That water makes up a total of how much?

A 704 inches.

Q And that 704 inches, will you restate, if you please,

its destination?

A That supplies the ancient quaternary which supplies the artesian ~~xxxxxx~~ wells and supplies the recent quaternary supplying the gravel reservoir, feeding all the water sources in the gravel basin and the red hill formation.

Q That is the ordinary flow?

A The average of the 38-year period; calculated on the rainfall of 38 years.

Q Now then, the ordinary discharge of the San Antonio Creek is how much?

A I can't say without referring to some especial time. I can give you the mean discharge as calculated, and the mean diverted discharge, but I can't say what the ordinary discharge would be without ~~referring~~ knowing what you mean by that. It is too variable a quantity.

Q By ordinary discharge I mean the same charact r of discharge as that which you stated is delivered here at the Red Hills by those four ~~xxxxx~~ sources, originally amounting to 704 inches.

A You mean then in the same way as the average discharge instead of the ordinary. That is average discharge which I saw is delivered to the Red Hills. The average as I calculated is 1748 inches from San Antonio Creek.

Q That is not summer discharge?

A That is the mean. The summer discharge is extremely variable with different months and different seasons.

Q Does that include flood water?

A It does; flood water and all other water.

[illegible]

Q. Did [illegible] [illegible] [illegible]

Q There is no flood water in this 704 inches contributed to these wells and ~~xxxxxxx~~ tunnels about the Red Hills?

A No; there is not. I didn't say there was; without artificial work to put it in there.

Q But I wanted not the flood water from the San Antonio Canyon but the ordinary flow-- summer flow-- which is of the same character as that which is supplied to the wells and tunnels in the neighborhood of the Cucamonga Red Hills.

A After deducting the estimated flood flow, the remainder as the mean discharge of the San Antonio Creek would be 1165.3 inches, taking off one-third for the flood flow, which corresponds with our knowledge on the subject.

Q 1165?

A Yes, sir.

Q What part of 1165 is 160?

A About 13.8 per cent.

Q Something more than one-eighth?

A Yes; somewhat less , because 8 times 13.8 is more than 100.

Q Something more than an eighth? Isn't 12-1.2 per cent. one-eighth?

A The quantity is more than one-eighth, if they had one-eighth.

Q Probably you and I have arrived at one issue which is susceptible of arithmetical computation; and I inquire of you if 13.8 is not more than one-eighth of the thing.

A It is considerable more.

Q How much?

A 12-1/2 per cent. is one eighth; 13.8 per cent. is what

we have here, making 1.3 more.

Q Precisely; that is what I say; that it is more than an eighth. It is something more than an eighth of the flow of the water-- the average flow, as you call it, of the San Antonio Creek, makes a bee line for the Red Hills and the discharge there in those wells and diversions.

A I don't know about the bee line part of it. I never saw water traveling in a bee line underground anywhere, but if you mean by that that it takes a course and arrives at that destination ultimately, I agree with you.

Q All right; I wanted to get your view. Notwithstanding the fact that it has to and does come out of the San Antonio Canyon watershed on the surface and traverses the greater part of the Cucamonga watershed, moving to the east, in your view about one-eighth of the water of the San Antonio Canyon emerges in the tunnel and the 16th Street wells and other diversions around the Cucamonga Springs?

A Now you are adding something which I did not say. I don't say it emerged there. I said it was tributary to that formation. Some of it may pass to the outlet to the west, and I think consistently all the way through, I never said that all the water emerged on the surface at that point unless it was developed.

Q It is part of the 704 inches which can be taken there?

A Yes; but doesn't all emerge in that formation. Another thing, you must remember the flood water has been deducted from the San Antonio Canyon, so it is not one-eighth of all the water.

on their lives, making life more.

Q. Incidentally, Mary-Jo-Jane I say; that is a very fine as well. It is something very fine as regards of the film of the story-- the average film, as you call it, of the Martin Street, under a big film for the day filing and the Kingsley Lady is been only and Lawrence.

A. I don't know exactly the film part of it. I never saw anyone. Something is a new film underground anyway, but if you mean by film that it takes I mean and writing at least doubling altogether, I agree with you.

Q. All right; I wanted to get your view.

Speaking the fact that it has is not that any one of the film Lindsay Tucker relating in the matter and involves the greater part of the Lawrence relating, acting in the work, in your view about worth of the major of the film a woman Sergeant in the Lady Lawrence with other Martin.

Would the Commission adjourn?

A. Now you are asking something which I did not say. I don't say it amongst them. I will be my business in that Lawrence. Now if it my part in the action in the work, and I think consistently all the way through, I never said that the major acting on the article at that point which I did not disagree.

Q. Is the part of the film acting which was in Lady Lawrence?

A. Yes; the Lawrence's all acting in Mary Jo-Jane.

A Martin Lady. The work consists in that when the film changed from one to a whole Sergeant, so it is not exactly of all the work.

Q That is what I am getting at. It is one-eighth of the average flow.

A The average normal flow.

Q Will you state again what you informed the Court is the ordinary or average flow from the Deer Canyon?

A The total discharge of Deer Canyon including the flood water would be 731.5. One third for the flood water would be 243.6 inches, which would leave a remainder of 487.9 inches.

Q 160 inches is about one-third of that, isn't it?

A 155 inches.

Q Perhaps that is it; the amount which goes to the Red Hill from Deer Canyon.

A It is a little less than a third.

Q But 155/487 of that Deer Canyon water always takes its way through the Red Hill, does it?

A To the Red Hill formation, principally to the east side.

Q That is, to the Lone Star Tunnel and to the Hermosa well and the Sunset well and to the Haskell well-- Any of it to the Haskell well?

A I think some of it might pass through the recent formation to the Haskell well.

Q Any of it to the 16th Street wells?

A It is hard to say; there might be some that would enter the recent formation and find its way that way; but I think the greaterpart of it goes into the other formation farther east. Also, the Y tunnel and Cucamonga Springs etc. Of course, anything in regard to that is an opinion as to how they divide, and ~~an opinion~~ a point on which there

is very little with which to segregate or make proportions, and I hate to specify any proportions that it is split up into after it gets into the other formations.

Q What proportion comes from Day Creek to feed these same Red Hill ~~ch~~ abstractions?

A I take the ordinary normal average flow of Day Canyon as being 315.7 inches, of which 24.1 I estimate is tributary to this formation.

Q What formation do you mean?

A The ancient and recent formation which supplied water for the Red Hills, natural springs, wells, tunnels etc. That would be not quite .8 of one per cent.

Q 24 inches?

A Yes.

Q You don't mean to say there are 24 inches there?

A No; I said 315.7 --

Q You say 24 inches would be .8 of one per cent.

A Oh, I mean 24 inches would be nearly 8 per cent. I might have made an error in the decimal here in my hurry. Yes; it would be something like 8 per cent. of that normal flow.

Q Between the Red Hills, or the west side, say the Ladie and the 16th street wells, and the divide between the San Antonio and the Cucamonga Creek, you have indicated here to the Court that there is an outlet of a so-called gravel basin, and that outlet I infer from what you said is full of quite porous material, isn't it?

A It is, overlying the more decomposed ancient material, which is the foundation of the whole country there.

Q In the travels of this water, the 160 inches from the San Antonio Canyon to the southeast, why doesn't it, instead of reaching the Red Hill, take a course through this outlet?

A Are you referring now to the water in the ancient or in the recent deposit?

Q I am not referring to the water in any particular deposit; you have given us 160 inches as coming from the San Antonio Canyon, and you have got it crossing this sluice way, this outlet of the gravel basin, where water is proceeding southward to Chino and the San Ana River at a great depth, and I inquired of you why that water from the San Antonio Canyon, instead of running across this depression, in order to butt up against the Red Hill, does not follow your outlet and proceed southward there.

A Well, in answering such a question as that, you have to recognize the known facts, regarding the geology, and distinguish the two formations, and that really is two questions; I can take them up one at a time if you wish me to answer.

Q So, I asked you only one question.

A You have a combined condition in your question; now, if we start first with the early deposit, or quaternary pleios-

ticene, as it is known in geology, the water after it has entered that is under pressure, and follows the old channels in the nature of an inverted siphon, emerging in wells or springs where it is folded or at a greater distance down in the main axis of the valley, ~~in~~ like the Santa Ana River, the Chino basin, or elsewhere; and after having once entered these channels, at some point below the foothills, it would then traverse the course in which that formation was laid down originally.

Now, turning next to the outcrop of it or the recent alluviums, or recent quaternary, that has also been laid down somewhat in that way, but not consolidated or laid down with such a preponderance of fine material, so the tendency of the water is to flow or percolate along the line on which these deposits were originally laid down, and a portion of this 100 inches, does, through the recent alluvium, find its way through that outlet; I do not think that all of it does, because of the way in which that deposit was originally formed; in order to do that it would have to travel transversely to the strike, which is a law not admissible, in dealing with water traveling through underground sources.

Q. You stated that the Bourwine well, next to the Ontario Colony lands, 184 feet deep, or such a matter, indicates a great depth of dry material, and that it is very coarse: those things you have agreed to?

A. It does, and I agree to that; that is part of the facts.

Q. Why should your water, your 100 inches, passing that opportunity to pursue the line of least resistance, down

through the outlet here, why should the 160 inches from the San Antonio Canyon, one-eighth of the entire ordinary flow of the San Antonio Canyon, avoiding the opportunity to get out through this coarse gravel, and sand, depressed at a great depth below the surface, at the point which is xx marked by our friends Mr Iras and Mr Finkle, as an outlet of the gravel basin, in order to go clean across the same gravel basin, and butt up against the west side of the Red Hill, principally we are informed in the neighborhood of the Ladie tunnel and the 16th street wells?

A First, because a part of it travels through the ancient alluviums which are underlying the recent coarse deposit of which you speak; secondly, because in this coarse deposit itself, there are certain stratifications, which are not anything like as marked as in the ancient, but nevertheless they do exist in a measure, which would have a tendency to guide some of that water away, but I do say that a percentage of that would gok to that outlet, and out of it, that is a portion of the percentage tributary to the recent alluvium; that percentage is not loss, as it is very beneficial to this basin, because by filling that cross section in the recent alluvium, it prevents the escape of water which comes in from other sources.

Q How can it prevent the escape of the water from the recent alluviums, when there is a vast prism of dry and unsaturated material at and above your outlet?

A Very easily, because if that water did not go in there, there would be a greater prism of unsaturated material, and the draft would be still greater, and more water would come

out; if you take some of the water out below, and thereby make a larger prism of the unsaturated material, or more voids, the draft on the basin above would be greater.

Q Now, you have divided your 100 inches from the San Antonio Canyon, which comes to the Red Hill, between the old alluvium and the new: To what extent is it divided?

A I don't think it is possible to make an estimate; you can assume a hypothetical basis of one-half if you like.

Q I don't want any hypothetical basis; You have 100 inches of water coming there from San Antonio Canyon, and I desire your statement as to how much of it is in the old alluvium and how much of it is in the new, or according to your theory following out your theories, how much of it will go to feed the water in the Radio tunnel, and how much the 16th street wells?

A That sort of an analysis is beyond the knowledge we have of these matters, and I cannot answer it; we can go so far in scientific matters and opinions, but beyond that point we cannot go without guessing, and that is not worth anything to your or anybody else.

Q Well, do you think one half of it is a fair estimate between the two, the old and the new alluviums?

A I can't express an opinion on that; you have just as good an opinion on that or anybody else, because the knowledge we have does not warrant us in making any such deduction.

Q If you are not able to make any deduction as to that, may it not all be going through one formation, rather than the other?

A There are all sorts of possibilities, and I don't care

which one you take; you can take anything that suits you or anybody else can do the same; it is undoubtedly divided between the two formations but in what ratio I cannot state.

Q. You don't know whether it is in the ratio of one to ten or one to one?

A. I might say that is probable, but I don't care to express an opinion upon anything upon which there is so little known; it is a matter of probabilities and speculation.

Q. Well, you have practically one fourth of all the water that comes into that district coming from the San Antonio Canyon, pretty nearly one fourth of all of it, and do you mean to say that all of that fourth, coming from that particular source shall be understood as emerging in either one of these formations or the other?

A. No; I say that I cannot segregate them; that is an impossibility and I won't do it; I won't attempt to do it, because I have no facts on which to base a segregation; it goes into one or the other of the formations but in what proportion I won't say.

Q. Would you undertake to say there was as much as 60 inches that comes through what you call the new alluvium?

A. Well, I don't know; there may be more or less; but if you want to assume something, you might as well assume that as anything else; if you don't know anything about it you might as well divide it equally.

Q. You tell us that water which passes through the new alluviums in order to get over there to the flood wall at all, and to escape the draft of this outlet down here, and the opportunity of escaping along the line of least

resistance to the south, is guided by some degree of stratification in the new formation?

A. I do say that it is in a measure guided, although there is of course a great deal of leakage in that very coarse material, more than in the ancient alluvium which is tight and compact.

Q. If you have got your stratification, guiding the water through the new alluvium from the mouth of the San Antonio Canyon to the 16th street wells, haven't you in your new alluvium necessarily got conditions there, which will produce an artesian rise in those wells?

A. No, sir; because the material is in a pre-generating degree coarse, and the decomposition of it is slight, and the guiding effect while it is there present in a measure, owing to the way it is laid down, it is very imperfect, and when you have too much, or any accumulation of pressure there you produce a leakage, which will shed the water out of the outlet.

Q. The mouth of the San Antonio Canyon, once that water starts on its path through the new alluvium to the 16th street wells, is several hundred feet higher than those wells, isn't it?

A. Yes, indeed.

Q. Now, then if that stratification has strength to guide the water from that elevation to the 16th street wells, hasn't it strength enough to produce an artesian flow in the wells to any degree?

A. Yes, but I didn't say that it had strength enough to do that; I said it had strength enough to create a tendency.

so that a portion of the water in the recent alluvium ~~xxxxx~~ might reach the 16th street wells, and the remainder would go through the outlet.

Q So that this entire proposition of water from the San Antonio Canyon coming over there, and butting up against the Red Hill, to the extent of one-fourth, nearly one-fourth of the entire supply, comes down to a might be, does it?

A No, it does not; it all is a benefit; that in the ancient alluvium is directly beneficial, because there the strength exists to guide it, and that in the recent is beneficial, even if it goes through the outlet, because it fills up the cross section and prevents other water, which would drain into that cross section, from draining out; it is all beneficial, and all necessary to preserve the equillibrium and the hydrographic conditions there prevailing.

Q I understood you to say that the inclination of water moving underground is to percolate along the lines of least resistance?

A That is true.

Q I suppose that means where the grade is the same, it will go through material of the greater porosity?

A Yes, having the same grade or pressure, through the more porous strata.

Q I understood you to say also that the movement of water percolating underground is at right angles to the hydrographic contours?

A That is true, as long as you have contours in the same formation; that would not mean that contours in sandstone connected with contours in gravel would be a true way to

test it.

Q Now, does not this map, Exhibit 29 show that the hydrographic contours envelop the mouth of the San Antonio Canyon in such a way thatthe movement of water out of that canyon is southwesterly rather than southeasterly?

A If you look at the canyon - -

Q I refer to the mouth of the canyon and the contours immediately below the mouth of the canyon.

A I am going to answer it that way; take the mouth of the canyon, and the contours there indicate that the water is travelin to the southeasterly, to a point which is three-quarters of a mile above the San Bernardino Base Line, and from that point - -

Q The Court, Q how do you harmonize that statement, with thestatement that the flow if the water is at right angles with the hydrographic contours?

A That is what this shows; this shows that the hydrographic contours are bent to the north, on the east side of the canyon very sharply, and that leads the water southeasterly to a point three quarters of a mile above the Base Line, and there turning southerly; beginning at the mouth of the canyon, it travels at right angles to these hydrographic contours, in gray, and would tend to the easterly to the point where Euclid Avenue is intersected by contour 1500, and from that point they would turn south through the outlet.

Mr Britt, Q Don't you see that the wash of the canyon is projected a little west of south?

A You were talking about hydrographic controus; not the wash; I was answering that way.

Q Don't you see that the contours are so spread across the Canyon, that if the water moved at right angles that it must move southwesterly?

A Some of it would move southeasterly, and some southwesterly and some southerly; I have allowed for only one eighth to go in this direction.

Q You have given one-eighth to the Red Hill?

A Yes, as benefitting that supply.

Q Not as benefitting that supply but as furnishing the supply.

A As furnishing the supply, if you wish it that way; that is correct, because anything which goes into the outlet and fills that dry prism furnishes a portion of the supply; these contours apply to the water in the recent alluviums only at all points except right in the Red Hill or Red formation, and have no application to the movement of water in the ancient alluvium, which underlies that, where the water is under pressure.

Q Give us the figures of that Cucamonga output again, the Cucamonga Canyon, how much of the ordinary discharge or average discharge.

A The total mean normal discharge of the Cucamonga Canyon watershed above base line, is estimated according to the Arrowhead curve, at 453.2 inches.

Q That is after deducting storm water?

A No, I beg your pardon; that is not correct; I gave you the wrong figures; I have several columns here; after deducting the storm runoff it is 606.3; the total is 909.5 and deducting from that one third or 303.2 would leave 606.3

as the mean normal runoff from Cucamonga Canyon above Base Line.

The Court, Q. Why do you deduct one third? Because of some peculiar characteristic applicable to that canyon, or is that a rule that would apply to all watersheds?

A. We have a great many records of runoff in these streams, some taken by the United States Geological Survey, and a great many by the Arrowhead Reservoir Company, in similar streams in Southern California, and the mean from those records appears to be about one third in canyons and mountainous districts of this character.

Q. And it is generally speaking then, without reference to any particular canyon?

A. Yes, that is a mean proposition, applying to this kind of a canyon.

Mr. Britt, Q. That is for the entire watershed above Base Line?

A. For the entire watershed above Base Line.

Q. It gives you how many inches as the normal ordinary flow?

A. It gives me 606.3 - 606.3 inches.

Q. Do you think that the Cucamonga Watershed produces six-elevenths as much water as the San Antonio? As a normal runoff?

A. Yes, I do; the computations are made exactly on the same basis of rainfall for the same elevations, and by the same formula and rules, and there is no reason why it should not hold good in one case as well as in the other.

Q. Do you think that if the Court was up there looking over the ground, when there was 3400 inches running out of

San Antonio Canyon, that there was 2000 inches escaping from the Cucamonga Canyon?

A That would be two-thirds.

Q Well, that is not far from six-elevenths.

A Well, I would make the proportion to be 1600 inches instead of 2000, taking these figures.

Q Well, that would be considerably less than half as much.

A Well, the San Antonio is over 1100; it is 1165; which would make it somewhere about 1600 inches in the ratio between the two.

Q Do you think that creek was discharging any such proportion to San Antonio Creek on the day when it was inspected by the Court?

A I wasn't near enough to the creek to form an opinion, and where I saw it it was over a mile below the mouth of the canyon, at the Frankish and Stamm tunnel, where it had been spread out and scattered over the ground artificially, and I had no way of judging; and there was also the diversion by the Ioamosa people which was being poured into the Lone Star tunnel on that day; all of those elements would have to be taken into account, and I could not form any estimate from the inspection made that day.

Q You got how many inches there for Cucamonga Canyon?

A 603.3.

Q Now, of that amount you have 360 coming here to this red mill have you not?

A 364 and a fraction.

Q Leaving about 240 to go elsewhere?

A Yes, sir.

Q That 240 escapes through this outlet does it?

A No, not all of it; a portion of it is diverted and used by the Ioamosa Colony.

Q How much of it is diverted and used by the Ioamosa Colony?

A Well, I don't know exactly; the testimony here gives a number of measurements, ranging between certain limits, it may be anywhere from 100 to 150 inches; I don't know; it may be 150 inches on the average.

Q Is it 100 inches?

A I should think it would be more than 100 inches, under the present way of taking the water and using it.

Q Well, suppose it is 150.

A It may be that.

Q That would leave 90 inches?

A That would leave 90 inches to migrate to the west, and possibly some of it out of the watershed and into the San Antonio watershed.

Q Why doesn't this water swing through the vast arc of a circle, between the Red Hills, the same as the water from the San Antonio Canyon?

A It does; that is why we allow that percentage; it swings through that arc marked on the map.

Q You have 90 inches there: How much of it escapes through the outlet down here, indicated on the map, Exhibit F, outlet of the gravel basin, where the arrow is?

A I didn't arrive at it in that manner; I will tell you how I arrived at it, the best answer to your question: Taking the Ioamosa water out, 150 inches, would leave 435 inches; now, then, from the probable swing of the stream and its

underground course, I estimate that 20 percent of that or 91 inches , would leave the Cucamonga water shed and be tributary to the ~~[illegible]~~ San Antonio watershed, and would therefore neither come out through the outlet, nor benefit the gravel basin in the Cucamonga watershed, which we are considering in this case.

Q Why do you only take 20 percent of the water of the Cucamonga watershed into the San Antonio watershed, when you bring over into the Cucamonga watershed about one half or more of the San Antonio water?

A A half or more?

Q You have one eighth of it, in much less than one half of the swing of your arc?

A Well, I think one-eighth is less than 20 percent. isn't it?

Q Yes.

A Well, I take a fifth of the total, after taking out the Ioamosa diversion, and bring it over into the San Antonio Canyon, and one eighth of the San Antonio into the Cucamonga watershed.

Q You take one fifth of that overinto the San Antonio, but have brought one-eighth of the San Antonio water up against the Red Hill alone.

A Well, I brought over one-eighth of the total normal flow of the San Antonio; I don't see anything wrong about that, do you?

Q I don't see anything wrong, but I see many things preposterous.

A Well, what are they?

Q I am not arguing with you now. You bring from your San Antonio watershed 160 inches up here against the Red Hill, the west side of the Red Hill, which is one-eighth or a little more of the entire flow of the San Antonio Creek.

A No, not the entire flow, just the normal.

Q What do you refer to as the normal flow?

A The average normal flow.

Q Average, normal: Are the terms interchangeable?

A Average normal, means the normal flow averaged for 30 years; it is not interchangeable with the entire flow because that would include the flood flow.

Q Wouldn't that average flow include the flood flow; didn't you include that in the first place?

A No, I segregated that in the beginning in reply to Judge Britt; I segregated the flood flow, and that left 1165 inches, as the average normal flow; that is the portion which we takeone eighth of or thereabouts,- less than one-. eighth,-and make it tributary to the Cucamonga Watershed in its underground course.

Mr Britt, Q Well, probably we can reach an understanding here if we go back a little; you get one-eighth of the water from the San Antonio Creek brought up against the west side of the Red Hill: What other proportionate part of the San Antonio Normal flow comes into the Cucamonga watershed?

A Well, I couldn't tell you that; the portion which is used for irrigation in the Cucamonga watershed by the San Antonio Water Company and its stockholders; I don't know how much that is.

Q Are you talking about water brought in by artificial

means spread out on the ground?

A No, I am not talking about that now; in answering your question I stated that all of this gray colored tract, is irrigated partly from San Antonio Canyon at least, in the Ontario Colony, and is all within the Cucamonga watershed and in addition to this one eighth or 160 inches, they bring in a large amount of the San Antonio Creek water, and apply it to that soil for irrigation; I have not considered that as an element, but as long as you asked if any other water from San Antonio Creek came over there into the Cucamonga Canyon watershed I desired to call your attention to it.

Q If that is what you are giving as the basis of your estimates, that puts in a factor that we are not considering now at all; I thought we were speaking of the flow of water after it sinks into the ground.

A I only spoke of it when you asked what other water was brought in from that canyon, and in answering that question I was compelled to tell you about that.

Q Leaving out of view, the water spread out for irrigation and taking the normal flow, natural flow not diverted by man, how much water in addition to the 160 inches do you claim comes from the San Antonio Creek or canyon, into the Cucamonga watershed?

A I made an estimate the other day of the replenishment by the San Antonio Water Company, which I made in two ways; one was for the lowest possible figure I could give, of 37 1/2 inches continuous flow, and the other for the highest figure of 75 inches continuous flow; that is the only other we have

in addition to the natural flow, and the irrigation water put on the orchards.

Q In addition to the 160 inches that butts against the Red Hill, you would get how much more that ~~that~~ comes into the Cucamonga watershed?

A Well, you would get somewhere between 37 1/2 and 75 inches continuous flow, from the replenishment, plus whatever return water there might be from that irrigation; that is an indefinite quantity which I could not estimate.

Q That surface diversion and spreading over the ground does not in any way illustrate the movement of water underground does it, when left undiverted?

A No, but that adds to the supply in the basin, replenishes the basin.

Q I thought that we had been talking about the movement of percolating water underground, how it moves from one source of supply to the other.

A We were until you asked me this other question, for any other besides the 160 inches, which was the natural percolating water moving underground.

Q How much natural percolating water will move into the Cucamonga watershed from the San Antonio watershed, besides the 160 inches?

A I stated no other natural percolating water; none other that I know of; that is my best estimate.

Q Then it comes to this: that all the water coming from the San Antonio Creek, percolating underground into the Cucamonga Gravel basin, goes to the 704 inches, which makes up the supply of water around the Red Hill?

A That is correct; that is a part of that supply, all of that 160 inches.

Q Having got into that water shed, it does swing across there, all of that, to the Red Hill, and none of it percolates along in the otherportions of the Cucamonga water shed?

A No, no; don't add any meaning to what I said; it goes in there, and the portion which does not reach the Red Hill through the ancient alluvium and its old channels, or through the recent alluvium, and through the newer ducts, goes down through the outlet, and occupies a cross section which would otherwise have to be occupied by waters from the Cucamonga Canyon, and therefore it indirectly performs the same office as if it were put on the gravel reservoir directly at the 16th street wells.

Q That isto say if you bring in from the San Gabriel River 50 inches of water and put it into this gravel basin on the west side Cucamonga water shed it would serve the same purpose of feeding the 16th street wells or Basin tunnel, as it were taken directly to those wells and tunnel?

A Not if you put it on Base Line; it would not go into the old formation, at Base Line; you would have to put it on at the foot ofthe mountains, in order for it to feed the old formation; you are talking about the 16th street wells?

Q Yes,- you have ~~xxxxx~~ spoken about the 160 inches as being a source of supply.

A It is a part of the source of supply, as long as it either goes directly to the wells, and furnishes the supply, or fills up thecross section draining that basin, so as to

A. Think so, certainly; that is a part of that supply, all of that life beneath.

Q. Having got into that water again, it does seem strange that, all of that, in the end still, that some of it particularly going in the direction of the Gulfstream water also?

A. Oh, my dear, dear sun-worship is what I mean; it goes in there, and the particles which have not passed through the ancient alimentary canal of the sea-animals, or through the present alimentary, but through the dung, goes along through the water, and nourishes a great world which would otherwise have to be nourished by waters from the Gulfstream Current, and therefore it particularly partakes the same action as it does put on the great resources generally at the land street value.

Q. Think then, sir, if you please, it from the Gulf Stream? The bottom of water that put it into very, very, deep, so the work which Gulfstream water wind, it would serve the same purpose of feeding the Irish street with the dung-manure, as it were, directly in some daily and regular?

A. Yes, if you put it in Gulf Stream, it would, of course, not form, at those times, you would have to put it in the old Gulf Stream without modification. In order for it to form the old Gulf Stream, you are taking away the Irish street water.

Q. Yes.- You have spoken about the 120 tonnes as being a source of supply.

A. It is a source of the source of supply, as they do in other cities directly in the sea, but Dublin has supply, or little by Dublin, as in the Gulf Stream.

retain the other water coming from other sources to feed those wells; in either event it is beneficial to that supply.

The Court, Q Do you think that that water spread or brought over there by the San Antonio Water Company at 19th street is far enough northward to supply the ancient alluviums?

A I do not; I think that all benefits the recent alluviums. In order to benefit the ancient alluviums it would have to be spread out near the mouth of the Cucamonga Canyon,- unquestionably so.

Mr Britt, Q Is that 160 inches of water that you speak of, all of the water of the San Antonio Canyon, according to your estimate, which escapes into the watershed of the Cucamonga Canyon?

A Yes, sir; naturally flowing.

Q And your estimate is that 90 inches of the Cucamonga Canyon water goes over into the San Antonio watershed?

A Naturally.

Q Now, that Deer Creek Canyon water - you have 155 inches?

A Yes, sir.

Q Coming to the Red Hill?

A Yes, sir.

Q Out of how much? 400 and something?

A Out of a normal average of 487.9.

Q And you deduce that quantity by reference to the arc of your red lines?

A I do, and considering mountain diversion.

Q Now, I want to inquire of you if water is not usually fed

into one of these debris cones principally from the washes in which it runs on the surface of the ground, whether the washes are long or short?

A A portion of it is originally, and a portion of it, which is the underflow of these washes, is fed in at higher levels, and may take a very different course from the surface wash.

Q Isn't it nearly all fed in from the washes, the surface streams?

A No, I wouldn't concede that; that depends on the depth of the fill at the mouth of the canyon and in the canyon itself.

Q How does it get down to the fill at the mouth of the canyon? Doesn't it come in a stream usually?

A Yes, but in the mountain canyons, which have a coarse fill between the bedrock and the surface stream that must be saturated before the surface stream will flow, and the portion underneath in that fill is what we term underflow in the canyon; and that portion is traveling sometimes at a hundred feet depth, and ofcourse is fed into the debris cones at a much greater depth than the surface washes are fed, and it may have no relation to the surface wash.

Q When the water emerges from the canyon and runs in a stream over the debris cone, isn't that the principal source of supply for the fan or cone, received by it during periods of storm? Isn't the cone replenished principally from that source?

A Well, you may say principally, and you may not; it would depend largely on the canyon you speak of.

Q Didn't you hear Mr Trask's testimony about the Frankish and Stann tunnel, in heavy rains when the water came down the Chesapeake Canyon in considerable quantities, that within a few days the Frankish and Stann tunnel discharged a great quantity of water, and pretty soon could peter out again? You heard that testimony?

A Yes, sir; I heard that testimony; that is undoubtedly correct.

Q Is it your opinion that that water was the result of water running in the channel of the Chesapeake Creek on the Ten?

A I believe that a greater part of it undoubtedly was; and that is often the principal source; it is at least a very important, or you might say the most important part of the source.

Q As the water descends, if that is a fair illustration, as the water descends in the canons or creeks or channels, which are found on the surface of the debris cones, it sinks into the material more or not at varying elevations, elevations which varyx with the volume of water poured in from the canyon above?

A Yes, sir; it sinks at all points in the channel where the water is flowing on the surface.

Q Has it't the rain the.. replenished mainly along the lines of the canons?

A No, I don't think so; because the water when it sinks first, while in the early stage of sinking it has a tendency to go downward, nevertheless the resultant friction in the debris, and the force of gravity gives it a lateral course.

Q. Didn't you say, or Trafie testimony about the Trafalgar and Alaska Sound, in every case where the water was down the Dangerous Cargo is considerable quantities, that within a few days the Trafalgar and Alaska Sound discharged a great quantity of water, and really made water and spilled the Dangerous Cargo?

A. Yes, sir; I have that testimony; that is substantially correct.

Q. Did your opinion that water was the result of water running in the channel of the Dangerous Cargo on the Deck?

A. I believe that a regular part of it undoubtedly was; and that is where the original source; it is at least a very important, or you might say the most important part of the source.

Q. In the water channels, if that is a fair illustration, a the water channels in the middle or around or between, which are found on behalf of the ship's crew, it might have the dangerous cargo; and not at regular intervals, alongside which the volume of water poured in from the cargo space?

A. Yes, sir; it would spread in the channel space the water is flowing on the bottom.

Q. Didn't you then originally mainly damp the floor of the cabin?

A. No; I don't think so; because the water when it ships first, while in the early stage of sinking it has a tendency to go forward, overcoming the resistance forward in the stern, and the fact of gravity gives it a natural course.

and the plane of saturation that is built up from the running stream flattens and flattens itself as it goes on, during the rainy season, and Mr Trask's testimony in regard to the Franklin and Stamm tunnel, which is a considerable distance from the running channel, is illustrative of that fact, that it spreads out until it finally covers the entire debris cone.

Q Well, then, percolating water underground, the mass of it, is somewhat in the form of a ridge isn't it, with its apex along the wash which feeds it?

A Its apex at the running stream.

Q The running stream which feeds it?

A That is true.

Q And that running stream, the distance to which it runs, depends somewhat on the violence of the storm, or the quantity of water descending from the canyon doesn't it?

A Yes, and the amount of silt carried by the water, and various other conditions of that kind - the narrowness of the channel, too.

Q Then if that isso, will not the most of the water in any debris cone or fan, enter the cone on lines which have a rough approximation to the principal surface wash or washes?

A I won't say most; I would say that more would be found there, than on the sides, but whether you are justified in saying that most, considering the narrow extent of the washes, I would say more in proportion to the area covered by the wash.

Q Take the Cucamonga Canyon: Isn't it reasonable to suppose that the far greater portion of the water which is dis-

1 charged on to the Cucamonga fan, is carried along southerly,
2 southeasterly or southwesterly, in the neighborhood of the
3 wash or washes into which it is divided when it comes down
4 from the mountain canyon?
5 A I coulon't go as far as that; I would state it fairly
6 as follows: that in proportion to the surface, a much great-
7 er part sinks and follows down by the washes, but from the
8 manner in which the debris cone has been constructed, as
9 soon as this water reaches certain depths, it leaves the
10 influence of the surface wash, because the surface wash
11 is only a temporary present accident; when it has sunk to
12 the greater depth it follows the laws governing the strati-
13 fication, or arrangement of the subsurface material, and
14 begins to travel laterally to a very marked degree.
15 Q It is carried out quite a distance into the plain, or to-
16 ward the plain, by those washes or surface streams?
17 A That depends on the size of the flow; if the flow is large
18 it is carried for long distances.
19 Q Well, doesn't it necessarily result that your red lines
20 here which illustrate the arcs through which you assume the
21 creek has swung, and does now swing, are carried too far into
22 the mouth of the canyon in every instance to illuserate prob-
23 ably and properly the distribution of water which escapes
24 from the canyon?
25 A I don't agree with that; I think that if you put those
26 central points from which the arc is described further down,
27 you would have a larger angle than the way I have made them.
28 I have endeavored to put it at a point which would fairly
29 approximate that the stream at some time has traveled within

the limits of the arc.

Q That comes to the final question on this proposition: Do you think that you can assume or ought to assume, that the water descending we will say from the Cucamonga Canyon is apportioned with any approximation to equality along the chord which joins the two sides of your triangle having its apex in the mouth of the canyon?

A I do think that it would be fair to approximately apportion it in that way, because the wash itself is so narrow that it cuts but little figure; I believe the hydrographic contours on Intervenor's Exhibit number 2, and my exhibit Z9, illustrate that, and the hydrographic contours at the mouths of the canyons indicate the same thing.

Q Well, then, it would result from that, that the water from the Cucamonga Canyon, just asmuch of it runs in the direction section 35, over in the San Antonio wash, or San Antonio water shed, as proceeds in the direction of the Red Hills?

A No, it would not; because there is only a very small part of that chord or arc, which opens towards that section ~~xx~~.

Q Distributing your water along the chord, you would have as much proceeding to the southwest, as you have proceeding south or southeast?

A In proportion to the chord, but not just as much, because the part of the chord tributary to the east is many times as great as it is to the west; but approximately you would have that rule holding good, in proportion to the length of chord which exists in the San Antonio watershed; and that is particularly as applied to the ancient alluviums.

Q I am speaking of the Cucamonga watershed.

the limits of the arc.

V. This comes to the final question, with a preliminary:

Do you think that you can sketch it again in barrow, that the wave disappeared as will say from the Dominion Lawyer is apparently with my apparentlnt in equally, along the lower white place the top close of your intensity having the open in the mouth of the engine?

A. I do think that it would be fair to apparently approption, it is that way, because the peak itself is at below that it was not little Figure; Exhibit the Lightpoint Problem on Government's Initial Report 2, and my activit 22, Illustrate this, and the Lightpoint moves at the middle of the magnet Initial the mean Right.

Q Well, then, it would result from that, that the motor from the Generator Engine, that amount of it goes in the Lightpoint motion 22, and is the for activity that, or the Initial Rotor alone, as presents in the direction of the the right?

A. No, it would not; because there is only a very small part of that energy at arc, which opens towards that motion 22.

Q. Electricity from motor along the shaft, you would have the most pressure in the neutral, at you have [illegible] motor or anything?

A. In proportion to the rotor, but not just at that. Because the peak of the stored Electricity in the rotor is not [illegible] greater in it is on the rotor; and apparently you could have that motion [illegible], in proportion to the length of stored motor energy in the Dom Electric Generator, and then it produces electricity as applied to the motion electrons.

Q. I am question of the Dominion Generator.

Q Well, I am speaking of that portion of the San Antonio watershed which receives water from the Cucamonga canyon supply.

Q If it would necessarily follow that you were getting approximately as much water from the Cucamonga Canyon here at the point where occur the figures 1323, T 1 N and T 1 S, which are just inside the right hand swing of your arc, as you were getting at the 10th street wells?

A Well, that is rather too far southeast, because we don't know anything about that formation; the Red Hill formation lies between that and the canyon, and I wouldn't want to go on record as saying the water would pass through that and reach that point.

Q Well, then take the other side: You are getting just as much water here approximately, on the left hand side of your arc, where you have marked T 1 S and T 1 S, between sections 3 and 34 and the base line, getting approximately the same quantity there, that you are receiving at the 10th street wells, local distance considered?

A Local distance of the chord?

Q Yes?

A In the ancient alluvium yes; in the recent I would say - -

Q Why do you make a difference between the ancient and the recent?

A Because the ancient is in compact clays and silts, its channels being veins; while the recent is a heterogeneous mass which has not yet decomposed and consolidated to enclose and preserve the veins as distinct channels.

Q Well, we arrive at some point of certainty, that so far

Q. Well, I am wondering if this question of how the outside material which involves water from the Dominion's carryon supply.

Q. It would consequently follow that you may getting impurities as much water from the Dominion Depot than at the other stations during Figures 1439, 1 2 and 1 2 3, which are just inside the right hand wing of your arc, as you were dealing at the 1439 stand point?

A. Well, this Investigation was for evaluation, because we don't know anything about Dominion Depot; the 1439 Stations (Dominion Depot) is the carryon, but I wouldn't want to venture an opinion by the water supply data that had been this point.

Well, therefore the point stands: You are getting your water from carryon, or you don't know this of carryon, those stations marked 1 2 and 1 2 3.

Those stations I did not get the time line, getting carryon, definitely the same carryon, this is the training in the 1439 stand point, that's Dominion Depot?

Yes.

Q. Is the water quality, in the report I would say - a lot of pre-war activities between the stations Dominion Depot?

A. Between the months, 1439 report stations with, the results this year, the report is a heterogeneous mixture of pre-war and contaminated.

Q. Well, I'm trying to get a clear picture.

A. 1439, the period of time prior of 1939, but on the

as the older alluviums are concerned, they are getting as much water in that portion of the swing indicated by red lines and indicated on this map, Exhibit P by the initials T 1 S, and T 1 N, between sections 3 and 34, as you are getting in the same local extent of space about the Red Hills?

A Probably; I see no reason why they shouldn't.

The Court, Q You spoke about the discharge from the canyon being practically uniform through the entire length of the Chord indicated by the Red line on the map to which Judge Britt has just been referring: Do you mean that applies to the underground flow?

A I mean to state that applies strictly to the underground flow in the ancient alluviums, and that it applies probably to the underground flow in the recent alluviums, which however are subject to much greater variations, and inequalities, and that the state and may admit of great local variations.

The Court, Q I was not speaking of any particular canyon; I am speaking of the general proposition.

A Well, of this in the recent fill such as we have overlying the cross section of the canyons, it usually is true; but you must remember that in the recent debris cones the wash is so irregular there may be local variations , which I have assumed in all my calculations, which I think is the fairest and most safe assumption to make, that these irregularities are likely to balance each other, and while for one special location the ~~xxxxxxxxxxxx~~ coarseness of the material may lead the water more to one side and the other, the reasonable presumption is that they are balanced within the limits of

the debris cone, and that rule being so, we are arriving at as correct a result as possible.

Q You are assuming in all of these calculations as to percolations and underground flow that there is a uniformity of formation?

A Yes, sir; and if the uniformity does not exist that the irregularities will balance each other.

Mr Britt: Then for the purpose of arriving at your conclusions here, you do not takeinto account the variability of the formation, or variability of the material rather in the same formation, for instance the modern formation?

A No, sir; because our knowledge is so restricted by lack of information along those lines, and can only be ascertained by extensive well boring over the entire area, that we are compelled to lay down the general rule and follow that.

Q Your answer is that in assuming the direction of the discharge from the mouth of any canyon, I am speaking now of your conclusion in regard to the geological formation, you must assume that it is practically uniform, unless you know of some controlling factor to change that?

A That is my answer.

Mr Britt, Q You have stated that you cannot apportion the water, which comes from the San Antonio Canyon to the Red Hills, between the two alluviums, the old and the new?

A Yes, I have stated that.

Q Can you apportion the water which comes from the Cucamonga Canyon to the Red Hill, between the old and the new alluviums?

A No, I cannot.

Q Can you make an apportionment of the water which comes

the Gaelic name, and look-this being so, in our writing
we be correct in trying to pronounce.

L: You are speaking to all of those publications as a
professional and competent. The Gaelic form is a subject-
ive of language.

A: Yes, well, with the multiplicity considered with that the
long irregular-like will balance each other.

Q: Erin: Come for the purpose of writing, as your reviews-
been here, you do not therefore consider the materiality of
the language, or materiality or the material problem in the
near Franchise, the Gaelic in modern formulas?

A: Yes, sir; because our business is so specialized by
lack of information about Irish-Gaels, and you only mere-
lained by reasonis well further over the entire area, but
we are compelled to lay down the general rule and follow that.

Q: Your theme is that in regarding the literature of the
standpoint from the point of its nature, I be speaking now
of your publication is rooted in the geological formation,
you want assume that it is pre-Gaelic-uniform, where you
have it, some controlling factor to change that?

A: That is my answer.

Q: Erin, I: You have stated that you would-interpret the
nature, which comes from the Gaelic Journal in the Ing-
lish, between the-two alternatives, the it was, the ever
A: Yes, I have stated that.

Q: Can you apprehend the water which comes from the Gaelic-
ye Langue as the one with, between the-of in the are alternat-
A: Yes, I mean.

Q: Can you make an approximation of the value which your

from the Deer Canyon to the Red Hill, between the old and the New alluvium?

A. I cannot, except to say that when you reach Deer Canyon, the probabilities are that the old alluviums receive more of the water from that source than it does from the sources further west, which is easily explained by the location of the areas of ancient alluvium, which in this eastern district south of Deer Canyon is much nearer the surface than further west, the recent alluviums covering it to a much shallower depth, and therefore the proportion from Deer Canyon which sinks, and goes through the recent formation and into the ancient is undoubtedly more than from those two canyons, the San Antonio and Cucamonga, lying further west, but as to giving proportions and figures, I cannot make any estimate of that kind.

Q. Can you make any estimate of the quantity of water coming from Day Canyon, which enters the old alluvium, and that which enters the new alluvium, at the Red Hills?

A. No, I cannot, although I believe that also is more favorable to supplying the ancient alluvium than those streams to the west of Deer Canyon; but I cannot give any figures or segregate them; it would be merely an approximate estimate; in fact it would not be an estimate; it would be a mere guess.

Q. Now, on the statements that you make here, about the distribution of the waters from these several canyons, doesn't it follow as a conclusion that the water occurs virtually in the same degree of abundance along the whole stretch of territory, at the foot of the mountains, from Pasadena to Highland, if the water is coming down from the canyons, and is appor-

tioned ratably to the swing of a possible arc drawn from the mouth of the canyon, then why doesn't the water appear in the ground with the same degree of abundance at all points south of the mountain range?

A It does appear wherever the watersheds are of equal area; ofcourse the ultimate final test, of all water supplies, whether underground or otherwise, are the areas of the water sheds and rainfall; but in the matter of underground water, the question of accessibility is one of enormous importance; because where there are no formations like the Red Hill, or the Indian Hill further west, or the Raymond Hill at Pasadena, which come near the surface, or project above the surface, there is nothing to hold the waterplane up, and it is so deep. that while the abundance is there it is not commercially accissible.

Q That is, theoretically it is there, but you don't know whether it is or not, not having reached it?

A Well, we can figure it out; if the water shed area is sufficient it is there; we have sufficient data on that subject to warrant a conclusion; in the San Bernardino valley we have the water near the surface, owing to the dike which confines the water, while you take it at Rialto west of the dike, the water is undoubtedly just as abundant, but at very great depths.

Q On that theory is not the water just as abundant on the line between the watershed which separates the Cucamonga Canyon from the Deer Canyon, as it is at any point under the washes coming from the Cucamonga Canyon?

A It is equally abundant but not at the same depths; as I stated there are controlling influences of the ancient

topography, covered by the modern formation, which govern the height of the waterplane; while the water is equally abundant, it is so deep where the ancient formations are not uplifted to retain it, that we cannot develop it commercially.

Q I don't see that it is necessary to the ancient or newer formations, if the water is thus interchanged between these several watersheds in the manner you have described here, why isn't the entire mass, depicted on that map, Exhibit F, of an equal degree of water abundance with that immediately under the washes?

A Do you now include the question or the element of the elevation of the water plane in your question?

Q I don't see why there should be any difference.

A Well, there is a difference; we can't ignore facts; therefore I want that in as an element of the question, or in my answer; we know the waterplane does vary in height throughout the whole section.

Q Do you mean to say that the waterplane is higher under the wash than it is along the divides between the several watersheds?

A No, I didn't mean that; I mean that where the ancient topography has been lifted to higher levels, forming these dikes, that that also lifts the waterplane between that point and the mountains, and you must consider that element in speaking of water that is commercially accessible for development; while the water may be equally abundant in in the deeper portions, which are not confined by reason of the ancient terrenes which are uplifted, that water is of no

hydrophobic, created by the molecule formations, which prevent the health of the molecules; while this water is equally dissolved, it is as deep-rooted the cellular formations are not quitted in proportion it, that is cannot develop it some-versatility.

(2) I don't see that it is necessary in the matter of lower formations, if the water is thus interchanged between these material substrata in the minute proportions described here, why isn't the non-moist room, supplied on high may, Dublin 2, of an equal degree of water absolutely with that immediately under the moment.

A: If you are talking the question of the amount of the elevation of the water plane in your movement.

Q: I don't see why there should be any difference.

A: Well, there is a difference; we don't ignore facts; imagine 2 mark that is as an element of the problem, so in my theory; we have the material that will be taken through the whole motion.

Q: Do you mean to say that the molecules in higher water has more; then it is clear for friction between the moving material.

A: Yes, I disagree that; I mean that there is another, fortunately the lower lifted is higher levels, forcing there, that the lifts the molecules between that pulled and the mechanism, and produced moisture that element is problem of water that is commercially acceptable for development; while the water may be equally standard in the lower positions, which is not affected by means of the moisture between which are qualified, that water is of an

value to us, but is of great value near the coast, where it finally finds its exit in the enormous artesian basins, around Long Beach and Santa Ana and elsewhere.

The Court, Q You say that where there are two adjacent canyons, the waters from which go to make up the underground supply, that the availability of that underground supply is dependent on the resistance or obstructions below?

A That is true; as to whether there is some obstruction there to impound it or whether it is permitted to escape towards the coast, or down to the lower valleys, such as the Rincon Narrows of the Santa Ana River; in the development of underground waters we have to study the ancient topography, and the geology of the uplifts, as that is what makes the water commercially accessible.

Mr Britt, Q We know that the San Antonio Water Company concluded that water was abundant where it put in those 16th street wells, that water could be obtained there in abundance: Why, on your theory, the water being generally distributed from the several canyons indiscriminately along the cord which intercepts the red lines which you have marked on this map, Exhibit P, why could not the San Antonio Water Company have put down those same 16th street wells, much nearer to Ontario, and have obtained the same quantity of water, and not have had to build so much pipeline to transport it?

A Because it would have had to have lifted the water so much higher, and the cost of lifting the water is a standing expense, a constant expense, and naturally when we advised the San Antonio Water Company where to develop water - I say

we, because Mr Trask and I advised them,- we advised them to go where the waterplane was within reasonable distance of the surface, instead of where it was two or three hundred feet below the surface; and that was done for the sake of economy; they might have put those wells down in the gravel basin under their own lands to the west, and developed equally as much water, but they would have to pump it so much higher, that the doing of that would be an imprudent thing, but its effect would be the same; they would take it out of another part of the basin and deplete it just as much.

Q You don't think it was because the Cucamonga Creek and the wash were there, and the formation of the ground was such as to bring water in greater quantities down to that locality?

A I know it was not; because I myself advised them on the subject and it was because of the uplift of the ancient dike which held the water back there, in that gravel basin, and that was the only reason I advised them to go there, and not go further west, which they could have done and obtained the water, but they would have to go three or four hundred feet or may be more.

Q You testified in the MacPherson case that the Red Hill was a mere cap, didn't you?

A No, sir; I didn't testify to that.

Q That it was a mere cap laid on the surface?

A No, sir; I didn't testify to that; you might make it appear that way by reading part of the sentences, as you did with Mr Mendenhall's report, but I didn't testify that way.

Mr Pritt: I ask that that be stricken out, what he says about Mr Mendenhall's report.

ne, because it first had I raised them,—a strange idea to ignore the metaphysics and utilize respectively opinions of the martyrs. Instead of which it was for us there instead just below the bottom; and that was done for the sake of economy; they might have put those walls down on the ground beside where their are fixed to lie down, and therefore equally as good water, but they would have to pump it up hard sides, that the energy of that would be an improvement thing, and its effort would be the same; they could take it out of another part of the basin and utilize it just as much.

I the air's fault it was because the Commission Creek and the Bend were there, and the Formation of the ground was such as to bring water in greater quantities down to this Building; I know it was not; because I repeat arrived then at the and just but it was function of the width of the Cistern also which has the water back there, in that always tends, and that was the only reason I advised that to go there, and not go further work, which they could have done not ex-hausted the water, but they would have to go three or four hundred feet to get to water.

I The hydraulic in the Indifferent view that the Cistern was a bad thing, didn't you?

A Sir, sir; I didn't hardly to that.

Q That it was a very bad fault on the workman?

A No, sir; I didn't hardly to that; you might make it appear that way by reading part of the evidence, as you can of it for Commissioner's report, but I didn't testify that way.

Mr Fitzi: I see that that is objection and, that we come above by Commissioner's report.

The Court: It will be stricken out.

Q Then you say the creeks which come out from the mountains and project themselves out into the plain, do not carry any greater abundance of water along their course than in the intermediate spaces between them, which are remote from the surface channels?

A Yes, if you refer to underground water as distinguished from surface water; and I mean by no greater, approximately no greater, because as I stated in former answers, there are local variations everywhere.

Q You gave some measurements of the San Antonio Canyon water and San Antonio tunnel water, in 1893, 1894, 1899, and 1904: have you measurements of that same water in other years?

A I don't think I have any other measurements of that water except those I gave; I have looked through my books and brought those here which I could find; I don't believe I have any others; I have a vast amount of books and they are all pretty well indexed, and I could not find any others.

Q I notice those years, at least three of them were very dry years, when the water you would necessarily expect to be low.

A Yes, they were. I want to qualify the former answer I made: Mr Trask gave some measurements which I made in San Antonio Canyon, which I made, and I did not repeat them;. he and I made them together; also another engineer; he has put those in the record, and I did not repeat them; they were made in ~~1903~~ 1893 and ~~1904~~ 1894, I gave in only those which he omitted, or which I did not make with him.

Q Have you not other measurements of that water in other

A I have a measurement in 1893, which Mr Trask gave in on the 15th of July; I can tell you which ones they are; but he testified to those, and I didn't think that it was necessary for me to put them into the record the second time. If you refer to page 2558 of the reporter's transcript - -

Q I have it.

A You will find on that date, on that page, under date of July 15, 1893, 512.3 inches for San Antonio Creek; and 251.4 inches for San Antonio tunnel; I participated in the making of those measurements; there were three engineers, Mr Trask was one, and I was another, and we had a third engineer, I believe Mr Jackson. Then also on July 16, 1894, I participated in the same manner with Mr Trask, and both of those measurements of that date were made by me as well as Mr Trask.

Q Was your measurement that you gave here in 1893, of the San Antonio Canyon water only, the creek, or did it include the creek and the tunnel?

A It included the canyon and tunnel, or creek and tunnel, whichever way you wish to express it; I did not repeat the creek measurements, because they were already given by Mr Trask; I simply gave you the tunnel measurement of October 2, 1893.

Q That seems to be tunnel water only.

A Yes, but the October 2 measurement of the creek was given by Mr Trask correctly and I did not repeat that.

Q On the 14th of January, 1899, did you have a measurement of the San Antonio Creek?

A No, I don't think I did; I gave you everything I had on

A. I have a memorandum in 1922, which we found gone in my the 11th of July; I can tell you which one they are; but be identified in Ghana, and I didn't think it was necessary for me to put them into the record the second time.

Q. Is you letter to your 2000 of the prosecutor's memorandum --

Q. I have it.

A. The will (?) on that date, on this date, under date of July 14, 1922, Elder Jensen for the Scandia Group and Mr. Hughes for the principle turnout; I participated in the making of those documents; early each year minutes, it took me one, and I was interior, and in 1922 beginning I believe in January. Then also on July 20, 1922, I participated in the same income with Mr Frank, and that of other memorandum of but also you made by me as well as Mr Frank.

Q. The two memoranda that you just have been in 1922, is the Jensen-Hughes point only, Mr Frank, or did it include the open-air the lease?

A. It included the mining and lease, as I have one lease, whatever my you also in mention 1?; I did not present the other memoranda, because they were already given by Mr Frank; I simply gave the lease memoranda of October 2, 1922.

Q. That seems to be Frank point only.

A Yes, but the Jensen-2 memoranda of the month was given to Mr Mr Frank originally and I did not repeat that.

Q. On the 31st of January, 1922, did you have a memorandum of the Ghana Lease?

A. No, I don't think I did; I gave you originals; I did

that date; I will consult my notes again.

Q Yes, I see you state here 379.45.

A 14th of January, 1899?

Q Yes.

A No, I have no measurement of that of that date.

Q No, that was the 11th of August, 1904. Have you yourself kept a table of measurements of the flow of that creek year by year?

A No, sir; I have not; I have only measured it professionally when I was called on to measure it, and on two occasions when I was appointed by the Superior Court of this County to measure it.

Q Have you given those measurements, all of them?

A Mr Trask gave those which were made by me under the appointment or order of the Court; it was in pursuance of a contract or judgment, to determine the amount of water, and three engineers were to do it, one appointed by each party and one by the Judge of the Court, and I was appointed twice to assist in those measurements; those were given by Mr Trask, as he represented the San Antonio Water Company both times.

Q Then the circumstance that the measurements that you gave of that creek, were measurements in very dry years, is a mere accident?

A A mere accident.

Q They have not been selected from a series of measurements from which you omitted the wet years?

A They have not; you will observe that one year there was a wet year, 1893.

Lord Cecil; I will consult my noble friend.

Q. Sir, I see you mentioned Crete.

A. Lord of Ashbury, Cecil.

Q. Yes.

A. Sir, I have no recommendation at this of that kind.

Q. Sir, what was the 11th of August, 1924. Have you ever said that a table of commodities of the City of Cecil Cecil year by year?

A. No, sir; I have only I have only mentioned it predominately when I was asked to do so before it, and in the Commission when I was appointed by the Governor-General of this Country to assess it.

Q. Have you given other commodities, sir of Cecil?

A. My Cecil with Cecil where were made by of other the population or water of the Court; it was in pursuance of a decision or judgment, in calculating the amount of water, and there requirements were to be it, we substituted by such-only sub-by the Judge of the Court, and I was appointed take to assist in that calculation; then was (Cecil by a Cecil, to be appointed the Lord Cecil Cecil Cecil late time.

Q. Then the commodities that you mentioned that you gave of that kind, your recommendation is very dry year, is a dry condition?

A. A very medium.

Q. Dry-year was been matched from a series of measurements from which you obtained the dry years.

A. Only here and; you will remember that-on year there was a wet year, Lord.

Q I don't see any measurement here that year.

A I didn't give it because Mr Trask had already given it. I gave you the tunnel because he had omitted that.

Q I want to talk with you a little about this rainfall record kept by Harwood at 22nd Street, I think you stated at 22nd street and Euclid Avenue in Ontario: what is the elevation of that place? 1700 feet above sea-level?

A 1700 feet above sea-level.

Q That is some 400 feet above the elevation of the Cucamonga Springs is it?

A I believe so.

Q Applying these various curves that you have talked about how much less would the rainfall be at the Cucamonga Springs than at this point of observation of Mr Harwood?

A it would be 1.8 inches; 300 feet difference in elevation.

Q Isn't it 400?

A Was that in the former question, 400; if I assented to 400 I meant to say 300, because the Red Hill is about 1400 feet above sea-level; ofcourse the lowest part where the Springs are is lower; the average elevation there is about 1350 feet above sealevel.

Q I thought you were taking 1285 feet as the elevation of the Springs for the purposes of the hydraulic head.

A Well, that is the very lowest point in the whole territory, if you consider rainfall you want to take the mean elevation of that neighborhood; however that only makes .6 of an inch difference, and would not be a material factor either way.

Q It would be 1.8 inches difference would it, from your

Q. I hadn't see any newspaper last year.

A. I'm afraid there is nothing in Times that already gives it. I gave you the lengthy because in fact neither that.

Q. I want to talk with you a little about this relative remote view by Bierman at Ohio Planet. I think you studied at Ohio school and Dentil known in Corvalis: What is the relation of Ohio planet 1700 Cen. Alpha and-Cyrus?

A. 1700 Cen. Alpha and-Cyrus unrelated.

Q. That is some 400 Cen. above the elongation of the Cosmopolis Pyramid in 12?

A. I believe so.

Q. Applying these relations review that you have talked about has made Jane would like relatedly in 4; the Cosmopolis Pyramid when at this point of observation of in Bierman?

A. It would be 1.0 indeed, 400 Cen. difference in elongations.

Q. Can't it 400?

A. Now that is the former question. 400; if I remember in 400 I meant to say say 300, because the Cen. 111 is closer light Cen. Alpha and-Cyrus; difference was lessened when the Pyramid was in Jane; the greater elongation there is lower 1300 Cen. Alpha and-Cyrus.

Q. I thought you were saying 1300 Cen. Alpha as the elongation of the Pyramid for the purposes of the horizontal level.

A. Well, that is the very Jupiter point in the whole history, if you remember relatedly you must to take the same elongations of Cen. Alpha and-Cyrus; however that only point, if at the last difference, not equal and is a material factor either way.

Q. As would be 1.0 Jupiter difference would it, Jupiter

initial point of estimating increase?

A If you take the top of the Red Hills, or approximately the mean elevation of the top of the Red Hill that is true.

Q The top of the Red Hill is lower than the ground at any of those 16th street wells isn't it?

A It is lower than the surface at any of the wells; yes; but there is a lower place between the wells than the top of the Red Hill.

Q Not so very much lower is it?

A Well, that profile you have here shows what it is.

Q Now, that Harwood place, you said the other day, was a certain distance west of the Cucamonga Springs: what was that distance?

A Due west it would be one and a half miles, from the west side of the main Red Hill, but it is also north; consequently it is two and a quarter miles in distance northwest.

Q Well, how much north is it of the place we call the Cucamonga Springs, the locality?

A It is one and three quarter miles north of the place we call the Cucamonga Springs.

Q And how much west? Two miles?

A You mean the east side of the Cucamonga Springs now?

Q Yes?

A It is about one and three quarter miles west also; therefore it is practically due northwest from the Cucamonga Springs.

Q And is close to the foot of the mountain isn't it?

A No, I think not; it is a considerable distance from the foot of the mountain.

initial point of reflecting increased.

A. If you take the dip of the hill, or approximately the same elevation of the top of the hill that is true.

Q. The dip of the hill is lower than the ground in the other hill-street mills Inc's (?)

A. It is lower than the motion already of the mills; they had been in a lower place between the mills than the top of the hill.

Q. Yes as very much lower in fact

A. Well, what specific you have here where was it in.

Q. Now, that Barrett place, you call the other dip, was a certain distance west of the Dominion Carriage; what was that distance?

A. You mean it would be one mile a half miles. Over the west side of the main hill hill, but it is a long range; consequently it is not as a quarter mile in distance apart.

Q. Well, how much room is in the place as well the Dominion Carriage, the Barrett?

A. It is one and three quarter miles north of the place as well the Dominion Carriage.

Q. Now how much north the place?

A. The same the road side of the Dominion Carriage?

Q. Yes?

A. It is about one and three quarter miles west side; therefore it is practically the northwest from the Dominion Carriage.

Q. Now is also on the line of the Dominion Inc's (?)

A. Yes, I think so; it is a considerable distance from the top of the hill.

Q Well, it is that much closer to the foot of the mountain than Cucamonga Springs?

A It is a mile and three quarters nearer the foot of the mountains than the Cucamonga Springs in a direct line.

Q Now, is it a fact that the rainfall there at Ontario, and in the neighborhood of this Harwood residence where that rain-guage was kept, is materially greater than it is, out on the plains to the south and southeast? Isn't it a circumstance that is very well known that the rainfall there is a great deal greater than it is on the level country to the south and southeast?

A You don't mean to say that is not a level country, or a sloping country, do you, in your question?

Q Well, all the country has a slope.

A It is an orange orchard and there are orange groves for miles on each side of it; I wouldn't want to answer that question and be on record as assenting to the fact that it is not level or sloping country, as we ordinarily denominate the valley there, but eliminating that I will say that the rainfall there is similar to what it is in that vicinity, considering the elevation of 1700 feet; I think that it would be higher than points lower than 1700 feet, and less than at points above 1700 feet, in that immediate vicinity.

Q Does not your rainfall as you proceed to the southeast from this Harwood rainstation diminish a good deal more rapidly than the elevation of the ground would indicate, applying your so-called curve, by which the rain is supposed to increase at the rate of .6 of an inch per hundred feet in elevation?

A I am unable to say yes to that or to say anything except that we have no records in that immediate vicinity other than the Harwood guage, and the record at Pomona and Ontario proper, all of which indicate a pretty close correspondence, and there being no record near by to the southeast, I can't say; after you get to San Bernardino, the decrease is somewhat more than the difference in elevation would warrant, but not very much; the mean at San Bernardino was 15.93 inches, practically 16 inches; and there it was 22.4; the difference between that would be 6.4 inches, and the difference in elevation is 700 feet, which would account for 4.2 inches of that, leaving a shrinkage of only ~~1.8~~ 2.2 inches, in that whole distance, and if you proportion that to the Cucamonga Springs which is only a mile and three quarters distant, the difference would be too small to consider of any importance; it would be a small fraction.

Q As you go towards Riverside going in that direction, or yet further to the west, the rainfall diminishes much more rapidly doesn't it?

A Yes, but I wasn't considering any locality between there and Riverside; I was considering some locality between San Bernardino and the Harwood guage.

Q Riverside is in the same direction as Cucamonga Springs from the Harwood guage.

A I wasn't aware of that fact.

Q It is more nearly in the same direction than San Bernardino isn't it?

A I don't think so; the maps don't show that to be a fact.

Q Well, you know at Riverside, the average rainfall is

about between 11 and 12 inches?

A Yes, and that is very easily explained by the topography; the Santa Ana mountains cut off the precipitation; I would not consider the Riverside guage as any criterion for the rainfall at the Pomona divide, or the Cucamonga Hills, or Ontario, which are located with an unobstructed area between them and the coast.

The Court: You have referred to two curves here in connection with the rainfall and runoff: which of the two do you consider the more reliable, the Newell curve or the Arrowhead curve?

A I consider the Arrowhead curve the more reliable on account of the fact that it is derived from experiments, on a similar range of mountains to this under consideration and with similar canyons and watersheds.

Q Do you know where Mr Newell conducted his experiments?

A Mr Newell took the mean of Geological Survey records all over the western part of the United States, and classified them into two groups, one called mountainous areas, and the other undulating areas; neither one fits this locality precisely, because the mountainous areas would be applicable to strictly mountain water sheds, and the undulating areas would be applicable to hilly watersheds with some valley s, and I took the one for the undulating areas, as being nearer to this condition north of Base Line, than the other one; that Newell curve is found in the 14th Annual Report, part 2, United States Geological survey, and he gives his data from which it was derived, in that report.

Mr Britt, Q Now, in reference to that Arrowhead curve, the

observations from which you deduce the so-called Arrowhead curve, were made on the north side of the range were they not?

A Yes, sir.

Q At what elevation?

A The elevation ranges from about 9000 feet at the head of Deep Creek, down to about 2500 feet or so, at Victorville on the Mojave River.

Q Was the rainfall observed at various points in that watershed, between the elevation of 9000 feet, and 2500 feet above sea-level?

A Yes.

Q Was it from those observations that the so-called Arrowhead curve is computed?

A It was, from the actual rainfall observed, and the actual runoff measured.

Q Between elevations of 2500 and 9000 feet?

A Yes, sir.

The Court, Q Judge Britt asked you about these measurements being taken on the north side of the range: What is your observation as which side of the range the greater rainfall occurs, the north or south side, in this locality?

A For a short distance beyond the crest on the north side, the rainfall is greater than on the south side; you take for example, on the Arrowhead watershed, what we call Horse's which is somewhere between half and three quarters of a mile over the crest, has the heaviest rainfall reported anywhere in the San Bernardinom mountains, much heavier than at Squirrel Inn, or any station on the crest on on this side

side of the crest, but when you go beyond that point, there is again a diminution, when you reach the gate house in Little Bear Valley, there is not much difference on the north and south side; and from that point the decrease in rainfall is considerable, as compared to the south side.

Q The general course of the rains here is from the south and southwest?

A Yes, sir; from the south and west; I want to say that the fact of the rainfall being greater or less does not enter into this curve; the curve is merely a ratio between the rainfall and the runoff; if the rainfall is found to be 20, inches, the measured runoff is a certain percentage of that, and the Arrowhead records are such as to cover all possible ranges up to 60 inches, and we have simply plotted that data on profile paper, and it can be applied to watersheds which have a different rainfall, so long as they are of the same character as the Arrowhead watershed, providing you take the proper point on the curve in applying it.

Q You speak of its being applied where it is practically the same: would the difference in the amount of timber on the north side of the range cut any figure?

A The watersheds on the north side of the range have heavier timber near the crest, but as you descend the timber is really more sparse than on this side, and the brush more sparse; I believe the average conditions on the north side, on the Arrowhead watersheds, are about the same as on this side, being heavier near the summit and lacking as you go down, as for instance in Holcomb Creek.

Mr Britt, Q Do you mean to say that the brush on the north

side of the mountains is lighter than on the south side?

A It is on that side of the mountain, after you pass Little Bear Valley, going towards the Forks of the Mojave; the brush is very thin on these hills; there is not much brush anywhere on the watersheds in the Arrowhead region, except on Deep Creek.

Q It is an observed fact is it not, and was it not in the earlier days before something or other got in its work, that there was a considerable quantity of water emerged at certain cienegas, and in the creek on the east side of the Red Hill? That was so, wasn't it?

A I don't believe there is any dispute about the amount of water that has emerged there from time to time.

Q There were also cienegas of more or less extent on the west side of the Red Hill?

A Yes, sir; there were; I don't believe there is any dispute about that.

Q Was the emergence of water in those localities due to the percolation of water through the formation?

A Undoubtedly so.

Q And its appearance on the sides of the Red Hill, cienegas east and west, was due to pressure was it, forcing the water through the ground?

A Yes, it was due to pressure, and the openings made by the fold, which made the less dense formation on the outside of the arc of the curve than inside, when the formation was laid down, which caused the springs to burst out through the overlying strata; and also the denudation of the fold tended

also of the concerns of Higgins' land or the north pole?

A. It is an land also of the mountain, after you pass little deer falling, going towards the Pass of the Indian; the brook is very high on those hills; there is not much brook anywhere on the mountains in the livestock region, except on deep brook.

Q. Is it an unusual fact is it not, you may go to the mailing-type bottle construction or other gas in the world, that there was a considerable quantity of water encountered in drilling underground, and is the crook on the road side of the Del Hill? That was so, wasn't it?

A. I don't believe there is any difference about the amount of water with the sunken type from other ones.

Q. There were also circumstances of more or less-strong in the week side of the Del Hill?

A. Yes, very there were; I don't believe there is any difference about that.

Q. Was the assumption of water in those tunnelings the by the presumption of water through the formation?

A. Definitely so.

Q. And the experience on the sides of the Del Hill, although most dry, was not so pressure one 30, Florida Bill water through tunnels?

A. Yes, it was not in pressure, and the tunnelings made by the Cole, which were not have been formed by the metric of the water of the water than water, when the pressure was less down, which caused the workers to before and through the everything already; and also the development of the Pole Tunnel

to make the covering between the coarser strata and the surface less thin from time toxtime and caused the springs to break out more freely.

Q You say the denudation made it thinner?

A The denudation of the original terrene of which the Red Hills are a part, when they were higher than they are now, leveling them down both south and west, would remove the Champlain clay, as we call it from the top, and make a thinner covering over that portion than the period preceding.

Q You said less thin: Then it was more thin instead of less thin.

A That was what I said wasn't it?

Q No, you said less thin.

A I beg your pardon; sometimes one says one thing when thinking of another; I meant more thin. I used the opposite word.

Q And the appearance of the water would not have occurred, but for the pressure of other water behind itby forcing it along would it?

A It would not;.because in order to have the water appear there, there would have to be a head on the strata which caused it to appear, at some higher elevation that the point of appearance.

Q Some higher elevation?

A Some higher elevation in the same strata.

Q And if the strata where the water appears are much broken up, jumbled up and disjointed, then that pressure may be exerted may it not, by any water which is in contact with such stratum?

A If it is in circulatory contact; not in static contact; where you speak of pressure, you have to distinguish between static pressure and hydraulic pressure; and water emerging in springs is always coming through and furnished under hydraulic pressure, and therefore water in circulation; water might be in contact through a medium so dense that it does not circulate, and if so would not aid the emergence of water through a coarser stratum adjoining it.

Q The water appearing in these strata or connecting these strata in the surface manifestations which were spoken of, must have been in circulatory condition.

A It must have been; otherwise it could not have emerged as springs; that pressure could not be derived from a dense close material, in which the contact would be merely of a statical nature.

Q Now, then, the water which was thus emerging was in contact with the mass of water in the saturated mass, in the saturated material, extending to the north up toward the foot of the mountains, wasn't it?

A What kind of contact do you mean? Circulating contact?

Q I mean contact such as would admit communication of pressure from one particle of water to another.

A Pressure, as well as motion?

Q I suppose if there was sufficient pressure there would be some motion.

A Not if the material was too dense; it requires pressure to create motion; but if you have a material so dense that it will merely hold water at rest, like dense clay in a dam, the water will saturate that and fill all the pores, but it

1 won't leak through the dam. In speaking of contact you have
2 to distinguish circulatory contact and static contact.
3 Q You have stated that the water appearing in the springs
4 and cienegas on the east side of the Red Hill was circula-
5 tory water.
6 A I have so stated; yes, sir.
7 Q Now, then, also, it was in contact with the water in
8 the saturated material to the north, extended up to the foot
9 of the mountains, wasn't it?
10 A Not the recent material; it was in contact so as to make
11 circulation or permit circulation throughout the entire
12 ancient material, but not in contact with the water-basin.
13 Q It was not in contact?
14 A Not in circulatory contact, permitting any circulation
15 of the water between the two; ofcourse there is a theoreti-
16 cal contact, which we call static contact, of all waters,
17 even from Bear Valley to this valley, through the rocks and
18 dense formations.
19 Q There was a contact between your newer and older for-
20 mation all along?
21 A There is a contact; but this contact is clay and fine
22 silts, and it is of such a nature that circulation of water
23 does not pass through it.
24 Q If the water was emerging in the Cucamonga Springs and
25 in the cienegas on the east side of the Red Hills, that was
26 evidence that it was not impervious, if it went through those
27 formations, wasn't it?
28 A Yes, through the veins in the ancient formation.
29 Q But you told us it was percolating through.

A That is what it was doing: percolating through the veins in the ancient formation, under pressure.

Q If that water is in contact with the saturated mass, in what you style the newer alluvium, above, what authority have you for fixing an impervious septum or screen that would prevent the communication of pressure from your water up there about the 16th street wells to that water which emerged in the Cucamonga Springs?

A The authority I have is the observed geological condition in this section; the creation of the ancient alluviums in one age in geology; the interval between known as the Champlain period, recognized by every geologist, and the uplift at the close of the Champlain period, and the deposit more recently of the new formation, nonconformably to the ancient, which facts are proven by the old gravel channels of the Champlain period situated at high elevations from which we can measure the extent of the uplift.

Q The elevations of this water appearing here in the cienegas on the east side of the Red Hill, and in the Cucamonga Springs in the creek along there, was not higher than the water where the 16th street wells ~~was~~ were situated was it? It was lower?

A Well, some parts of it was lower and some parts higher; it depends on the time you take it; that matter has varied from time to time, depending on the condition of the various wells and to the relation which existed between the wells there and even the Haskell wells - -

Q Wait a moment; I was not asking you about relation; I will talk with you about that later on; I am asking you now if

the water in the Cucamonga Springs was not at a lower elevation than the water in those 16th street wells, as it was observed,- if the actual elevation of the waterplane was not some lower?

A Well, I wouldn't say at all times it was.

Q Well, wasn't it generally?

A It has been lower, and I suppose it has been higher; the measurements in the case would show that; I can't carry them in my head; it depends on the fluctuations that have occurred there from time to time, but those two waters have not any relation one to the other.

Q Have you given now all the reasons why there is an impervious septum dividing the water where the 16th street wells are, from the water which did emerge in the Cucamonga Springs?

A I think I have referred to all the reasons; I might go into greater detail on the geology, and explain the differential movements of subsidence and uplift more in detail, but I did not consider that necessary, as it can be found in text books and other publications which people can read.

Q Your theory and your view and your statement here is that you have a mass of saturated material lying to the north of the Cucamonga Springs, and the water emerging in the Cucamonga Springs at a lower level than the water which feeds your 16th street wells, but that although there is circulatory water emerging in the Cucamonga Springs, water moving under pressure, water exuding from the ground, over a considerable extent of territory, yet that there is a dividing blanket of some material there which absolutely shuts off and prevents the communication of any sort of pressure,

from your waters which feed the 16th street wells and the water in the Cucamonga Springs: Is that it?

A That is correct: I think that fact is proven beyond any question by the statistics in the case and the geology.

Q I wanted to see how far your theories carried you here.

A It is not a theory; it is a fact; I think we can demonstrate that and have done so.

Q You don't hold it as a theory?

A No it is not a theory, because it is recognized as a fact and one of your own witnesses Mr Stowell testified to the contact he saw there in the Eadie tunnel, when I was with him, at the same time.

Q Nobody denies that there is a contact in this territory here, but I fail to see why water will not break through from one formation to the other.

A The nature of the contact establishes that; and the relation of the wells showing the relative elevations is a stronger element.

Q Like the variations which you read off yesterday morning, where you said that the variations in the Haskell well, from the Bellmer well number 2 at the head of the west branch of the Y tunnel, where it was .1, and .2, and .3 and .5 and .6 , that there was a wide range of variation.

A Yes, sir; and up to six and seven feet; there are some in the record which I did not read off; I forgot those; and there were some in your exhibit 3 which I did not read off.

Q I will come to that later; I have something to say to you on that subject; you take the water in the saturated mass in what you call the newer alluvium, or in the material where

the 16th street wells are situated, whatever it is,- it came there by nature, to within a distance of 50 or 60 feet of the surface, and stood there as appears from your own observations, as you have given them?

A Personally I never saw it as near the surface as that; Mr Trask has seen it within 30 feet of the surface at some points.

Q You testified about the depth to water in the Haskell well, that you went down that shaft?

A The Haskell well, 61 feet, and well number 3 of the San Antonio Water Company, 79 and a fraction and 80 xxxxx and a fraction, on different dates, was the testimony; the Haskell well was 60 to 61 in 1889.

Q And those wells bored down to a depth of several hundred feet, show that there continue to be strata of water bearing material throughout the depths of the wells do they not?

A They show that it was practically all gravel in well number 3, and a great deal more silt and clay with the gravel in the Haskell well.

Q You consider that that material is saturated throughout with water?

A I consider that all of that material, with the clay and the gravels are saturated with water, but the movement occurs in the gravels and sands, and not through the clays.

Q And it exerts a pressure, according to your law, in all directions or only downward?

A The force of gravity acts on it downward, but as the water is in motion the resulting action is a slanting component which indicates the pressure, at some angle with the

[illegible]

[illegible]

[illegible]

vertical and horizontal.

Q And at the surface, or say 10 feet below the surface of the waterplane in that material, are you able to state the extent of the lateral pressure?

A I am not without making observations, because the friction must be deducted; all of that water is in motion, except possibly at the Haskell wells, it was not in any perceptible motion.

Q You did not perceive it in motion anywhere?

A We know from the xxl slope of the waterplane and the character of the country that it is in motion; that is practically perceiving it in motion.

Q From which direction is it in motion?

A Wells, 1 to 5, of the 16th street wells, the motion is to the southwest; and as to the Haskell wells, I was never able to observe in the hydrographic contours any motion; it seemed to be in the corner of the formation of that nature, and so much of the fine silts of the ancient alluvium filled in with the recent, that motion is repressed, and the water seemed to be almost quiescent.

Q Don't your hydrographic contours show the slope to be to the east?

A Yes, on that contour map the slope is shown to the east, and this being from two formations it tends to the southwest from the 16th street wells.

Q The Haskell wells are in the old alluvium?

A No, sir; they are not; the Haskell wells are in the transition zone of the two formations; the denudation of the red hills mingled with the recent has built up a complex

vertical and horizontal.

Q. And in the motion, or may it not be that some of the material in that material, are yet able to obey the laws of the lateral pressure?

A. I am not without visible circumstances, because the fluid-matter is destroyed; all of which rely in in motion, except possibly in the Sensil cells, it can not in any perceptible motion.

Q. Do the two properties it is solid in motion?

A. We know from the 3rd Edge of the Mechanics and the Character of the Molecule that it is in motion; that is essentially preserving in in motion.

Q. Does which direction in it in motion?

A. Well, I do Q, if can into motion cells, the motion is in the movement; and in in the Sensil cells, I can never tell in absence in the experimental evidence any motion; it seems to in the course of the revolution of that matter, and so much of the fine cells of the nervous cells-when filled in with the remark, that motion is impressed, and the motion seems to be acted motion.

Q. Don't your experimental evidence show the state to be in the motion?

A. No, in that motion and the stage in above in the work, and this motion from the formation is large to be produced from the lower cells.

Q. The Sensil cells are in the old situation

A. Yes, Sir; the are not; the Sensil cells are in the transition zone of the Sun Terminus; the connection of the two fully adapted with the remark the cells go a complete

formation there which is different from that of the 16th street wells, and also essentially different from the old alluviums; it is a secondary formation from the old alluviums mingled with the recent.

Q Are those Haskell wells separated by the same sort of a septum or blanket which prevents the water coming to them out of what you call the new alluvium?

A They are separated, yes; in the bottom the ancient clays are still undisturbed, and separate those secondary deposits from the ancient, intermingled with those of the recent, from the watersin the ancient alluvium; that accounts for the lack of relation between well number 7 and the Cucamonga Springs.

Q It will also prevent any relation between that and the 16th street wells?

Mr Joliffe: The witness, I think, misunderstood the previous question.

(Question and answer, beginning on line 5, this page, read to witness.)

A The answer to the question was not responsive; I replied to what I thought was a different question. The reply to the question would be that there is not any complete separation between the formation in the Haskell well or wells, and the recent alluviums, but thereis a partial separation caused by the large admixture of clays, coming from the denudation of the Red Hills in that corner of the basin; and also the fact that the water must have been in a state of eddy, at that point which made the formation more dense than the other recent alluviums in the main channels.

Immediate data which is different from that of the line above only, and also essentially different from the old alternator; it is a secondary discussion from the old alternator which applied this the reason.

Cure time doubtful with separation by the same body of evidence or timing; which permits the data owing to have said if what you call the not alternator.

A: They are separated, yes; in the testing the actual line are still isolatively, and separate lines permanently separate from the matrix. Interpolated with lines of the remark, from the matrix the replace alternator. Also separate for the line of relative Determination will number 7 and the Determination Type.

Q: It will also permit any relation between that and the line above only?

Mr Jaffe: The alternator, I think, disconnected the primary operation.

Examination and answer, beginning on line 9, this page, read as follows:

A: The answer to the question was not frequently; I supplied to such 3 hourly was a different question. The amplifying the question would be that there is not any complete separation between the transmission equipment that is used, and the voice, and the voice alternator. The operation a period separating means by the large distance of line, owing from the matrix-design of the old line in that manner of the circuit, and also the fact that the water must have been in a state of duty, as that point which was the Transmission Line line the other voice alternator in the main exchange.

Q Then the water does percolate up there, and the pressure is exerted from what you call the new alluviums into the formation which contains the Haskell wells?

A I suppose theoretically that it does; we have not been able to observe any practical percolation; at least I have not from any figures, or observations I made, but I would suppose that theoretically there is a circulation, but it is only theoretical, however, and so far as I am testifying to it, it is not based on any facts which I have seen.

Q If it is only theoretical and is not practical, doesn't that amount to practically saying that the Haskell wells are shut off from contact with the new alluvium?

A In a practical sense I would say that the Haskell wells are shut off from contact with the new alluvium at the other 16th street points; but I do believe it has contact with the new alluviums further north of that point; and in that way, indirectly, it may have contact with the other 16th street wells.

Q That is to say the water which feeds the Haskell wells comes around some barrier which extends to the north, and which separates the feed of the Haskell well from the feed of the 16th street wells?

A Not any barrier; I would illustrate it by saying that the numerous clay strata in the Haskell wells may be likened to the fingers of my hand, pointing up to the north, those clay strata being caused by denudation from the Red Hills; and the spaces between my fingers might be compared to the water bearing strata; to the west of this or toward the other 16th street wells I don't believe there is any contact;

in an east and west line there probably is a barrier at that point; but I do think the strata pointing to the north pinch out, these clay strata which are formed by the denudation of the Red Hills, and that the generally supply of the gravel which feeds the basin, feeds the Haskell wells through those pointed strata.

Q Now, if the general supply of the gravel basin feeds the Haskell wells in that manner, why may it not be communicated to and feed the exudations of water in the Cucamonga Springs?

A Because the Cucamonga Springs are in the ancient alluvium, which is a different formation, much older, and underlies this more recent gravel.

Q You have those Haskell wells in the older alluvium.

A I have not; I have said they are in the recent formation, which is composite, being built up by the recent wash, as well as the washings from the Red Hills, when they were higher than they are now; they were at one time undoubtedly higher than they are at present, as they have gradually worn down, like all hills will in time; and that excavation of the Red Hills by washing down to the north, could not be carried out by floods on account of this elbow or eddy in the dike; and the best information which I have on the subject, leads me to think that the Haskell wells are not in the ancient alluvium but in these extreme corner of this recent alluvium, with the secondary deposits from the ancient, and they might properly be ~~exlim~~ classed in a class by themselves on that account.

Q You don't know whether the Haskell wells are fed from

water from the new alluviums or not?

A Yes, sir; I think they are fed from water from the upper part of the basin, from the new alluviums; I was in considerable doubt for a long time as to the Haskell wells and their nature, until making exhaustive studies of the relation between well number 7 and the Cucamonga Springs; after making the study the great preponderance of the evidence was against their being in the old alluvium, taken in connection with the non-artesian character of well number 7.

The Court, Q Well number 7 isone of the haskell wells is it?

A That is one of the Haskell wells.

Mr Britt, Q The water percolates with a good deal of freedm at the haskell wells?

A It does through the gravel strata which are comparatively thin, compared to any of the 16th street wells, where the whole material is nearly all gravel.

Q The Haskell wells have been the most prolific wells that the San Antonio Water Company had there haven't they?

A I don't know as they have.

Q Don't you know they pumped them more, and got bigger volumes of water out of them, than any of the others?

A No, I don't know that, and in regard to that - -

Q Well, if you don't know, you don't know; that is an answer to the question.

A Well, I was going to explain; I have a right to explain my answer when I say I don't know a thing; I wish to explain that by saying that when the Haskell wells were first pumped they yielded an enormous quantity of wat r, something like 122 inches from one well; but that has steadily dimine

water from the new situation or not?

A: Yes, sir; I didn't the pure water from the upper part of the basin, from the new situation; I was considerable doubt to allow him to be the natural entry and their entry, until another examination of the pipeline between will answer I and the Commonwealth Bridge; after making the study the great physicians of the building was against their allow in the air situation, taken in consideration with the non-corrosive character of well water?

The Court, Q: Will counsel I know of the Lambell well is it A: That is one of the Lambell wells.

Mr Grick, Q: The water particulars which you said of Lambell as the Lambell wells?

A: In view therefore the ground water which are completely dry sits, compared to any of the high stream wells, those the whole material is quite old gravel.

Q: The Lambell wells have been the week quality with that the Gen Authority water Company but where happen? Why?

A: I don't know my lady here.

Q: Don't you know they people have more, and low higher volume of water and of them, what any of the wells?

A: No, I don't know that, and to expand to know - -

Q: Well, if you don't know, you don't know; this is no answer to the question.

A: Well, I was going to explain; I have a right to explain my answer when I say I don't know to being; I will be explain then by saying that, when the Lambell wells were first opened they yielded an enormous quantity of water, something like 700 Imperial from one well; the head was naturally flows-

ished; and that the wells have declined more rapidly than the others, owing to the denser formation and the difference in character.

The Court, Q As I understand you, you are of the opinion that there is something in the nature of a reservoir along 16th street that those wells tap?

A Yes, sir.

Q Do you mean to say that the Haskell wells are in a different reservoir or in a branch of the same reservoir?

A I think they are in the extreme corner of the same reservoir, but the condition of the formation is so much disturbed by the intermingling of the materials, as to make those wells have somewhat different characteristics, and the formation being so dense, and the gravel strata so thin, the supply is likely to become exhausted, and has become very much diminished by pumping.

Mr Britt, Q Don't you know that the waterplane at the Haskell wells is as high as at the other wells, relatively to the elevation at which it stood when it began to be pumped?

A I have not compared that.

Q Don't you know it does not differ in that respect?

A I would haveto look that up, Judge Britt; I have not compared that; I have not made that comparison but I hardly think it is as you say; my opinion is now that it is not, although they have been pumped a good deal less the last few years than the other wells.

Q Are you not mistaken about that, too?

A No, I am not mistaken about that, the last few years; they were pumped more in the early times, but not so much in the

late years.

Q Look at page 277 of the record.

A I have the page here.

Q Pumping in 1907 - Don't you observe that the Haskell well number 8 was started earlier than any other well pumping - that that well was started earlier in 1908 than any other?

A Yes, that was used to irrigate that orange orchard of Mr Atwodds, and it was running only periodically.

Q Do you notice September 19, it was pumping 69.80 inches, while there were only two of the other wells pumping at all?

A Yes, it was pumping 69.8 inches on September 19.

Q There were only two of the other wells pumped at all?

A Yes, I notice that.

Q Don't you observe that there are as many measurements of the pumping of that Haskell well on that page, in the year 1908 - -

A That is 1907 .

Q 1907 I should say - as there are of the other wells, and only two wells pumped?

A Yes, if you limit it to 1907, that is true, but if you extend it over the next year, 1908, you will find the reverse is true; I was referring to the whole thing for the last few years; to the whole record; not to this specific year; that is the last year in which the Haskell well was pumped heavily

Q 1907?

A Yes, sir.

Q Well, that is not so long ago.

A Season before last; in 1908 you will find only three

like people.

Q: Look at page 3117 of the record.

A: I have the page here.

Q: Turning to 1927 - Don't you observe that the Australi will number 1 was started earlier than any other well drilling - this was well was started earlier in 1920 than any other?

A: Yes, that was used to irrigate that orange orchard of Mr Ainsworth, and it was running only periodically.

Q: In the entire Dalhousie, it was running 69.85 hours, while there were only ten other wells drilling at all?

A: Yes, it was running 69.8 hours on September 3.

Q: There were only two of the other wells drilled at all?

A: Yes, 2 million bbls.

Q: Don't you observe that there are as many occurrences of the running of that Dalhousi well on that page, in the year 1920 - -

A: That is 1927.

Q: 1927 I mean my - as there are at the other wells, and only two wells running?

A: Yes, if you limit it to 1927, that is true, but if you extend it over the next year, 1928, you will find the reverse is true; I was interesting in our whole table for the last six years; in the whole record; and in this especial year; that in the last year in which the Dalhousi well was running heavily

Q: 1927?

A: Yes, sir.

Q: Well, this is not so long ago.

A: Because earlier than; in 1926 you will find only three

measurements of the Haskell well ~~t~~ two measurements of the Haskell well - in the whole record; and that it was only pumped 9 days and 12 hours one time; and then number 8 was pumped 14 hours to irrigate the Atwood place; and then you come down to August 7 and it was pumping on that date, and on the other dates below it was not pumped at all except as noted in the margin, July 17, when it was pumping as noted there.

Q. More of the wells were pumped in any continuity in that year, in 1908?

A. Yes, indeed; if you look at the tabulation of measurements, you will find they were pumped quite heavily that year.

Q. Do you mean to say now, are we to understand you to say that the Haskell well petered out in 1908?

A. No, I don't mean that; I mean it produced in 1900 something over 100 inches, as high as 122 inches of water, and ~~t~~ that it has declined until it pumped 50 or 57, and up as high as 79 inches, the highest measurement in 1907; in 1908 the highest measurement of that well, November 22, was 57. 99 inches; it has declined almost one-half from what it was when it was first started in 1900.

Q. Well, does not that depend on the amount of power you use?

A. The power has been the same for a great many years; they installed the electric power in 1902 and have all the power they want there.

Q. Wasn't number 3 pumped so as to yield more water in 1900 than it did in recent years?

A. I will have to look that up before I would answer, because I can't carry all these figures in my head. Number 3 did

[illegible] of the Sandall well? The measurements of the Sandall well - In the single pressure; and that it was only pumped 3[illegible] days and it empty per time; and that number 1 was pumped 14 hours to irrigate the Alfred plant; and then [illegible] from 1[illegible] August 7 and it was pumping on that date, and on the other dates before it was not pumped at all except as noted in the pumping, July 17, when it was pumping on other days.

A. Some of the wells were pumped in my possession in that year, to light.

Q. Yes, indeed; if you look at the beginning of measurements, you will find they were pumped quite heavily that year.

A. No [illegible] in my mind, but as to measurements [illegible] that the Sandall well pumped not in 1909.

Q. Yes, I don't mean that; I mean it pumped in 1910 [illegible] [illegible] 1[illegible] hours, in fact we did [illegible] water, and I think it has declined. Until it pumped 50 or 60, and up as high as 70 hours, the highest measurement. In 1910; in fact the highest measurement of that well, December 30, was 70. My history; it has pumped almost non-halt from that to now [illegible] it was first started in 1909.

Q. Well, [illegible] on the amount of power you want?

A. The power is [illegible] the same for a great many years; that [illegible] the Clarita plant, in 1900 and [illegible] all the power that that [illegible].

Q. Sandall number 2 pumped as to be still [illegible] water in 1909 [illegible] ground [illegible]?

A. I will [illegible] that on other I [illegible], because I can't [illegible] figures in my head. [illegible]

not furnish nearly as much; in fact some of the measurements in 1900 were less than those in 1908. And there was only one large measurement of that in 1900, which was 111 inches; the others were all below 100, and in the Haskell well in 1900 there was a measurement of 132 inches.

Q What is the lowest measurement you find for number 3 in 1900?

A You want to compare the highest measurement of one period with the lowest of another.

Q You say the well petered out.

A Well number 3 in 1908 ran from 34 3/4 inches up to 83 inches.

Q September 5, 1908, well number 3 was pumping 34.75?

A Yes, sir; and October 19, 83.89; October 28, 83.89; November 2, 76.7.

Q Wasn't it because they didn't wantto pump more than that on that low measurement?

A I suppose the machinery was out of order, or they didn't wash to pump any more.

Q You have as much reason for saying that well number 3 declined, because you find in 1900 it pumped 111 inches, and in 1908 it pumped 34 inches, as you have to say that the Haskell well is exhausted, because it only pumped 50 inches in 1908.

A The average of the Haskell well in 1900, was 109.45, and the average of well number 3, 77.11, so that you see there has been a much greater falling off in the Haskell well, if you compare it with the average of the two years, than there has on well number 3.

and furnish nearly as much; in fact some of the measurements in 1900 were here then in 1900. And there was only one large measurement of land in 1900, using one III inches; the others were all being 5ft, and in the August well in 1800 there was a measurement of 555 inches.

What is the least measurement you find for number 3 in 1800?

A. The well is complete the highest measurement of the period with the least of another.

Q. You say the well gathered sun.

A. Well number 3 is 5700 yds from 24.004 inches, or at least.

Q. September 5, 1900, well number 3 was yielding 84.117

A. Yes, sir; had yielded 57, 58.09; October 30, 60.09; November 2, 56.7.

Q. Wasn't it because Cly/Ellis's mortis long have them that on that the measurement?

A. I believe the auxiliary was not at other, or they didn't seem to pump any more.

Q. The lower at seen reason for saying that well number 3 decline, because you find in 1900 it yielded 111 inches, and in 1901 it yielded 56 inches, be you know it may have the health well is exhausted, because it only yielded 80 inches in 1902.

A. The average of the health well is 1900, was 104.02, and the average of well number 3, 77.12, so here you see there has been a much greater decline of in the health well. If you compare it with the average of all the years, then there has'n well number 3.

Q. Give us the average of the Haskell well in 1907: You don't think the Haskell well petered out in the year between 1907 and 1908 do you?

A. The average of the Haskell well number 8, was 73.8 in 1907, as compared with 109.45 in 1900.

-o-

Here the Court takes a recess until tommorrow, April, 8th, 1909, at ten o'clock a.m.

-o-

J. W. McKinley

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co et al

Plaintiff

vs.

San Antonio Water Co et al

Defendant

April 8, 1909

Vol. 48

Index.

		Cross Examn
F. C. Finkle,	(By Britt)	4310
	(By Waters)	4390

I. BENJAMIN, Official Reporter

Thursday, April 8, 1909. Forty-Eighth Day.

F. C. FIELD.

Mr. Britt: Q Where is the page of the transcript to which you were to refer us?

A First, beginning page 1838 at line 19, and extending from there to line 12 on page 1839. Then also on page 1858 from line 25-- you might begin a little further back to understand the context-- at line 20 and extending to and including line 5 on page 1859.

Q That is all, is it?

A That is all.

Q Yesterday afternoon toward the close of your testimony you ventured a proposition in substance that the Haskell well or wells although originally wells of considerable productivity of water had in recent years been showing signs of exhaustion.

A I said they had failed more than the others; I didn't say they were exhausted.

Q Now I want to call your attention to that proposition. In the first place, let me call your attention to page 2469 of the Reporters transcript.

A I have that page before me.

Q And also page 2478. They are right close together.

A I have that also.

Q You claimed to confirm your deductions by reference to the fact that the Haskell well no. 8 on November, 23, 1908 was pumping only 57.99 inches. Do you observe that?

A I observe that; but that was not the only measurement I used in making my deductions.

Q You remember I inquired of you if that might not be because of a deficiency of power and you replied that the power was constant there.

A Yes; they had an electric motor there.

Q And you recall also that I ventured the inquiry whether you thought that that single measurement was an indication of the petering out of the Haskell well and you said that it was.

A That single measurement is not all that I relied on; I relied on all the measurements taken together.

Q Calling your attention to page 3469, that shows measurement of the Haskell well, the production of water in the year 1900, doesn't it?

A Yes, sir.

Q At numerous intervals, made by Mr. Frash?

A It does.

Q And there was but one Haskell well at that time?

A I so understand; yes; there was only one Haskell well at that time.

Q I notice that you called attention yesterday that on March 13, 1900, the Haskell well pumped 122.30 inches.

A Yes; you are reading that correctly.

Q That that was the highest measurement, it having begun on February 11 with 112.70 inches. That is right, is it?

A That is right.

Q And it varied along always less than either of those figures, sometimes up and sometimes down, and on October 9 it pumped 54.65 inches of water.

A Yes; I see that.

Q Did that measurement indicate exhaustion of ~~xxxxx~~ the well at that time?

A I don't know. I didn't see that measurement taken. I am basing my calculations on all the measurements in the record and not on one or two. I will ask you if that measurement in 1900 which was less than one-half of the maximum pumped sometimes that year, indicated exhaustion of the well?

A I don't say that one measurement indicates anything. I was taking the average of the whole thing and it indicates a partial failure of the supply of the well. I am not confining myself to one measurement, because there might be peculiarities which do not apply to the others.

Q That is not what you said yesterday.

A I would like to have you read it to me.

Q We will traverse some of the other measurements. I will ask your attention to page 2095. You observe there, do you, the report made by Mr. Sanders of measurements on October 4, 1901?

A I do.

Q You notice that both Haskell wells were pumping there?

A Yes, sir.

Q And there was drawn from each of them 68 inches of water?

A I observe that; yes.

Q And you observe that two other 16th Street wells were pumping at the same time, one 70 and the other 72 inches, leaving out the fractions?

A That is substantially correct.

Q The Haskell wells furnished at that time pretty nearly as much water as the other two, did they not? You see by the measurements that each well was furnishing somewhat less than the other two?

A But you also see that the Haskell well had fallen off gradually from 1900, the year previous.

Q The two Haskell wells were furnishing within a few inches as much as the other two wells?

A I was speaking of the decline in the Haskell wells yesterday.

Q You were talking about the exhaustion.

A That is the very thing I was talking about, and it is not fair to say that this comparison has any bearing on what I said yesterday. I said there was a decline in from 1900 when the Haskell wells were first developed, and I am going to stick to that statement and prove it whenever you want me to.

Q You are saying there was an exhaustion of those wells compared with the others.

A Compared with the others, I say the decline in the Haskell wells was greater comparatively from the time it was first developed than it was in the other wells from the time they were developed. That is my statement and I am going to prove it if you give me a chance.

Q Now turn to page 3413. You have that page before you?

A I have.

Q You notice that Mr. Trask's testimony there showed that he credited some time in 1901, the date not being shown, the Haskell well no. 3 with pumping 71 inches and the Haskell

well no. 7 with pumping 68 inches.

A I observe that.

Q While the well no. 3 and no. 2, the present numbers, were pumping 72 and 70 inches.

A I observe all that.

Q No signs of exhaustion there?

A There is, because the Haskell well in the year previous pumped an average of 109 inches which shows a decline-- 108-- showing a decline of 41 inches ~~xxxx~~ in the ~~xxx~~ then ~~xxxxxxxx of the~~ Haskell well which was well no. 7.

Q There were other wells being pumped at that time, while when the Haskell well first began to be pumped there were no other wells pumped.

A Afterwards it showed that that was not the cause of it. In the later years when the Haskell well was pumped alone it showed what I said was the case and not your present theory.

Q doesn't the necessities of the company, having but one well pumped at that time, have anything to do with the quantity pumped?

A At that time, I don't see how the necessities could increase the capacity of the well

Q But if the company chose to exert more power and to pump more water from the Haskell well when it was the only one they had there pumping, wouldn't that account somewhat for the subsequent taking of less water from that well, when more wells are opened up?

A You are now injjecting something which is not in evidence and on which I could not base an opinion.

wall No. 7 with pumping 50 hours.

4. I observe that.

5. Write the well no. 3 and no. 5, the previous readings, more pumping 72 and 70 hours.

6. I observe all cases.

7. Do place of measurings history.

8. Charge in water-by the Dunlap well in the year pre-ceding pumped to average of 100 hours which means a de-cline of 100 according a decline of 61 because dam, the exceptions which Dunlap well which was well no. 7.

9. There was a history which being pumped. In such time, while that has Dunlap well first begun to be pumping there was no other well pumped.

10. A experience is proved that with the pumping of 15. In the later years with the Dunlap well was pumped. Which it observed some 1 when was the same but was pumping history.

11. Because the characteristics of the pumping, having that may well pumped for short time, more importing to be with the possibly pumped.

12. As that time, I don't see the characteristics really increase the capacity of the well.

13. That if the pumping cause a water more power but we may have water from the Dunlap well. When it was the only one that have the pumping, mother's time measure which for the measurement reading of Jane water from Dunlap well, when many wells are pumped.

14. The are one following characteristics which is not in wells pumped and in which 7 wells not have the pumping.

Q But it is in evidence.

Mr Surr: There is nothing about more power.

Mr Britt: I didn't say anything about more power.

A I am basing my opinion on the measurements, and the figures in the record; I am not basing my opinion on some assumption which you may make and which is not in the record.

Q You testified about the sympathy that was exerted by one well on the other.

A Where?

Q That 16th string, all of them?

A From 1 to 5; yes.

Q From 1 to 8.

A Did I?

Q Yes.

A Will you please show me where I did?

Q Didn't you testify to that?

A Show me where I did.

Q Mr Trask did testify to that didn't he?

A I am not basing my testimony on what he testified to; I am answering my own questions.

Q I will find it for you and show it to you.

A Well, I wish you would because I never testified to that.

Q I am referring to the testimony you gave yesterday, about the flow to the Haskell well, around some barrier to the west, and the effect of that around the Haskell well.

A I didn't say there was any effect in practice; I said that I couldn't observe any and didn't observe any; I have

been showing you the pages here in regard to which you asked me, and I wished you would show me that.

Q I will also point you to some figures which show the same thing. I will ask your attention next to page 512: have you the page before you ?

A I have page 512 before me now.

Q You notice there is a record of a measurement by Mr Trask, on June 23, 1903, that the Haskell well was pumping 91.2 inches?

A I notice that.

Q And that the well number 3, was pumping 60.8 inches?

A I notice that.

Q Do you see any signs of exhaustion in the Haskell well relatively at that time?

A Those two measurements would show an exhaustion relatively in the Haskell well at that time, but that is only a single measurement, and I base my statement on all the measurements relatively, and not the measurements on a single day.

Q You say that relatively that shows an exhaustion in the Haskell well and not in well number 3?

A That shows the Haskell well was pumping 91.2 inches at that date, as compared with 109.45 in 1900 on an average, and as compared with 132.3 on one date in 1900.

Q And as compared with 54 and a fraction on another date in 1900, wasn't it?

A Yes, if you take out one date; but if you take the average measurement for 1900, it shows an exhaustion.

Q Does it show an exhaustion as compared with number 3?

Were driving one day some body is trying to which you
judge on, and I wished you could ride on that.

Q. I will also write you in some Congress which may lay
some blame. I will not give anything more to pay this
have you the same belief?

A. I have plus all belief on me.

Q. The motive there is a second of a demonstration by
Crook, on June 23, 1923, that the Daniel well was supplying
Ed.2 Indent?

A. I realize that.

Q. And that the well number 2, was supplying Ed.2 Indent?

A. I realize that.

Q. Do you see any chance of misunderstanding in the Daniel well
relatively at that time?

A. There has nevertheless would then be misunderstanding rela-
tively to the Daniel well at that time, but that is only
a little experiment, and I help of statement as all the
commissioner relatively, and not the measurements as a
single one.

Q. You say that relatively that shown in misunderstanding to
the Daniel well and not to well number 2?

A. That shows the Daniel well was supplying Ed.2 Indent at
such time, as compared with Ed.2 in 1920 as an experiment,
and as compared with Ed.2 in our case in 1920.

Q. And in comparing with Ed and a Trenton in million cubic
in 1923, model's (1)

A. Yes. If you look not now today that Ed.2 was below the
average consumption for 1920, is above or average.

Q. There is more an misunderstanding in comparing with number 2?

A Those two measurements would not demonstrate that proposition, but when you come to the later years the proposition is fully demonstrated, when we have numerous measurements.

Q Look on the same page, 512, January 22, 1904, very early in the season, and you see the two Haskell wells were together pumping 109.84 inches, don't you?

A I do.

Q Well number 7, 55.30 and well number 8, 53.54 -

Mr McKinley: That makes 108.84.

Q Making 108.84, while the well number 3 was pumping 74.60, and number 4, 48 inches: Would that indicate any exhaustion of the Haskell wells?

A It does, because the two Haskell wells together are not pumping as much as the average in 1900, while the well number 3 is pumping practically as much as the average of that well for 1900; while well number 4 has nothing to do with it, as that was not considered in our proposition; that well did not exist in 1900; and I think this decidedly proves what I said, that the Haskell wells have become greatly exhausted, when two of them will not pump as much in 1904 as one did in 1900, four years previously.

Q You think that proves the Haskell well was becoming exhausted?

A It tends to prove it; it is one of the factors that does prove it; you notice that there is a gain in well number 3, over the mean of 1900 for that well, while there is a loss of one inch, if you compare both Haskell wells with the mean amount being pumped from one in 1900.

A. Thirty-two microscopes would be necessary to
investigation, but what you mean is the Silver-Jerome law
practically is fully demonstrated, when we have measure
measurements.

Q. Have we the book volume, Mr. Jennings Co. 1924, study
in the library, and you see the the Samuel Wells were be-
ginning physicists 300.04 bottom, Mr.'s pend
Q. I do.

Q. Will number 7, 30.13 and will number 6, 30.04 -
Mr Ballinger: Then return 10.04.

A. Reading 300.04, which the will number 2 was begins
74.07, and number 6, 40 lower: Washburn Galvanometer
Deadline of the Samuel Wells

Q. If then, because the the Samuel Wells Laboratory
was begins to work in the Swarthy in 1909, while the Wells
number 2's is showing periodicity in work on the energy of
that with the 1890; which will number 2 was working in 1
1919 1, so that you are maintained in our investigation;
that but the was acted in 1909; and I think this instantly
proves that I said, that the Samuel Wells were blown
greatly damaged, when the of time will not pump on work
in 1907 or was its in 1904, the here there previously.

Q. The wires that gives the Samuel Wells the Samuelsy
laboratory.

A. It leads to prove it; it is one of the factors that
does prove it; you notice that there is a gain in well
number 2, very low work of 1907 for that well, while there
is a lower at the time, if you compare two Samuel Wells
when the other Samuel Wells number 2 was the in 1907.

Q Those two Haskell wells draw virtually from the same supply don't they being so close together?

A I don't accede to the proposition that if you put two wells as far apart as those are, that even if you do draw from the same supply, that you do not increase the amount obtained; if you proceed on that theory, you might add the output of wells 2, 3, 4, and 5 to the output of well number 1, and you would prove my proposition stronger than ever.

Q One Haskell well on June 23, 1903, was pumping 91.2 inches?

A That was a falling off.

Q They had greater need of the Haskell water originally, didn't they?

A Well, I am not going on any such proposition; I am going on the figures in the record; if you are going to inject other factors which are not in evidence, I can't discuss the proposition with you any further.

Q Oh yes, you shall , and you will answer the questions I put to you, unless the Court rules that you shan't.

A I can't answer that question, because I know nothing about their needs; I was not there to know about that.

Q You say that the two Haskell wells were being pumped on January 22, 1904, to an extent one inch less than when they were pumped in February, 1900, or through that season, the average was 1o9, that that shows that they were becoming exhausted?

A It certainly does; if you can't get as much out of two wells in the same locality, as you did out of one originally, it must show a depletion of the watersupply.

Q If you are satisfied with your logic all right.

A I am satisfied with it.

Q Well, then look down there on the next month, February 8th, 1904, and the well number 7 was pumping 56.7 inches, and the well number 8, 52.16 inches, or 106.23 for the two.

A I beg your pardon; that is wrong; 108.86 for the two.

Q Yes, 108.86: Does that show also the exhaustion of the Haskell well at that time?

A As compared with 1900, four years previous it does; it shows not an exhaustion, and I don't want to accede to that word, because exhaustion would mean a failure of the supply, but what I stated as my proposition was that the supply had shrunk in that well more rapidly than in well number 3.

Q You said especially in recent years?

A Yes, sir; especially in recent years; 1907 and 1908; but it has shrunk all the time as shown by these additional figures that you brought out.

Q Now, I will call your attention to page 82, you have it before you?

A I have it.

Q I inquire of you if it does not appear that the Haskell well number 8, was pumped that year thirty days earlier, for a time which began thirty days earlier, and altogether with more persistence, than any other of the whole string of wells?

A That does appear; yes.

Q Does that indicate that the well was becoming exhausted?

Q: If you are satisfied with your judge all right.

A: I am satisfied with it.

Q: Well, then let me have a look at the most useful, February 1964, and the only thing I was puzzled by? Looking, and the well known, Q. Still before, if that's the case.

A: Using your personal, look it really, that's the time.

Q: Yes, indeed. Then this was also the administration of the Council will be that time.

A: In December 1964, the year previous to 1965; it also had an Commission, and I don't know to answer the 1965 work. Because administration would have a failure of the judge, and when I stand as my presentation was that was simply not enough to that will have really been in that number.

Q: The 1965 specifically in second period.

A: Yes, 1965 specifically in second period; 1967 and 1968; that is the period all my time in where I have statement figure that you brought me.

Q: Now, I will ask your indulgence to page 65, you have it before you?

A: I have it.

Q: I begin at the 11 in the 1st lines that the Council will answer to the judge that your hiring was merely, for-a-time which your hiring was merely, and although there may have at the work during it years.

A: That was correct, yes.

Q: Now that indicated such the will be knowing when that

A I don't know as that indicat s anythin on that subject.

Q It does not?

A Not that I can see; the measurements might indic to something but that fact wouldn't indicate anything.

Q Now, you will observe that it began on May 19, with 62.70 inches?

A I do.

Q On June 18 it was 82.70 wasn't it?

A June 18, that is right.

Q While none of the other wells were pumped at all then, you observe that do you, except number 3?

A I see that.

Q Does that mean that those other wells had petered out and failed, because they were not pumped at all then?

A I should say not.

Q Simply it indicated that the company didn't need the water from the wells at that time? Isn't that the explanation?

A I suppose the company pumped what wells they wished to pump; I have no kno ledge as to what led them to pump one in preference to an ther.

Q It is a reasonable assumption that they did not need that water?

A The assumption is that they pumped what they needed; if they needed more I suppose they ould have pumped more.

Q You are the witness who said here a few moments ago that you were governed only by the figures; the Haskell well that year was pumping a large volume of water, before any other well was mentioned ; according to that , that would lead you

to the conclusion that the other wells had become extinct, would it? That would be according to your reasoning?

A No, sir; I should think not; I don't think my reasoning would lead to any such conclusion as that; I should hope not.

Q Now, you observe that on June 18, 1904, the well number 3 pumped 48.89 inches?

A I see that.

Q While the Haskell well number 8 was pumping 44.70?

A That is true. That is in the record.

Q Would you say that that indicates that the Haskell well was becoming more exhausted than the well number 3?

A No; I have told you repeatedly, and I wish to repeat it once more, that two single measurements on one day do not indicate anything; that my conclusion is drawn from the bulk of the measurements, and the average of them, and comparing the average of 1900, with the average up to date, and I say that substantiates my conclusion; but I could make any sort of a conclusion, and substantiate it by isolated figures on isolated dates.

Q You were doing that a few minutes ago.

A I don't think so.

Q Then you were asserting that the two Haskell wells together in 1904, in February, were only pumping 100 inches,- that that showed exhaustion?

A I said if it showed anything, it would show that; if the two wells were not pumping as much in 1904 as one did in 1900, but I have drawn my conclusions from all the years particularly the ~~xxxlyxxyearxx~~ recent years compared to 1900.

Q On June 18, the Haskell well delivers as much as well

to the mountains that the ethos really had become religious, would it? That would be something to your credit!

A. Oh, sir; I should think not, I don't think my reading would lead to any such conclusion as that; I should have not.

Q. Then, you charge that on June 16, 1908, she will receive 2 pounds 16.80 liquor?

A. I do not know.

Q. While she Kimball will answer I was proving 16.?

A. That is true. That is in the record.

Q. Would you say that that indicates that the Kimball will was receiving more stimulated than she will receive 2?

A. No; I have told you repeatedly, and I ask to repeat it once more, that her single consumption on one day is not indicate anything; that my conclusion is drawn from the bulk of the consumption, and the average time, and comparing the average of 1908, with the average of 1909, and I say that substantiates my conclusion; but I could not make any part of a conclusion, and substantiate it by individual figures on individual days.

Q. You were doing that a few minutes ago.

A. I don't think so.

Q. Then you were arguing that the prohibitory policy adopted in 1906, in Victoria, was not causing the increase, that that caused substantial.

A. I only if it did so anything it would have been. If the well were not coming on such in 1906 as one did in 1900, but I have drawn my conclusions from all the years particularly the [illegible] years preceding to 1906.

Q. On June 16, the Kimball mail delivery is most as well

number 3, although pumping a month previously, and well number 3 not pumped at all; You notice on June 27, well number 3 had declined, and it was pumping less than it was on June 18, while the Haskell well had increased its output on the same date.

A I see that difference of .4 of an inch.

Q Does that indicate exhaustion of the Haskell well?

A I don't claim that indicates exhaustion.

Q Do you claim it indicates a relative decline of the Haskell well?

A If you follow the figures down to the final ones, you will see a very different result by the figures.

Q It varies, sometimes up and sometimes down, sometimes one way and sometimes the other?

A It varies but the average of the whole thing substantiates what I stated yesterday.

Q You need not repeat that so often; because I notice that you claim anything in the world substantiates what you say.

A Well, I have the averages and I can give them to you.

Q Well, take July 16, which is about a month after well number 3 began pumping, and which is some two months after the Haskell well began pumping, and you observe well number 3 was pumping 29.44 inches: Do you see that?

A I see that; but why don't you go down to July 26, when the conditions are reversed? I have stated repeatedly that it is useless to waste time on isolated measurements, because you can prove anything you want to that way.

Q This was after it had been running for a month, and number 3 declined straight along.

number 3, although varying a weak correlation, was well
number 2 not varied at all; the ratios on Item 22, well
number 2 had decreased, and it was varying less than it was
on Item 18, while the Rorschach well had increased its out-
put on the same date.

A. I see that difference at .4 of an inch.

Q. Does that indicate extraversion or the Rorschach well?

A. I don't think that indicates extraversion.

Q. Do you think it indicates a relative decline of the Ros-
well well?

A. If you follow the figures down to the final score, you
will see a very different result by the figures.

Q. It varies, sometimes by one hundred or so, sometimes
one very and sometimes the other?

A. It varies but the average of the whole thing substanti-
ally what I stated yesterday.

Q. You need not repeat that my action; because I realize that
you state anything in the well substantiates what you say.

A. Well, I have the structure and I can give them to you.

Q. Well, take Judge 12, which is about a month after well
number 2 began grading, and which is some two months after
the Rorschach well began grading, and you observe well number
2 was grading 22.44 inches: Do you see that?

A. I see that; but why don't you go back to July 12, when
the results are reversed? I have stated repeatedly that
it is insane to grade like an isolated measurement. Be-
cause you are going deviating you must to that end.

Q. This was after it had been grading for a month, and
number 2 devilped straight along.

A You are going over a table now, and picking out the high ones for well number 8, and the low ones for well number ~~4~~ 3

Q Oh no, I haven't.

A If you take some other date it will be reversed, and you will prove the opposite of what that proves, if it proves anything; what is the use of wasting time on that.

Q Take from June 18, 1904, until July 16, 1904, and didn't the well number 3 diminish in its discharge right along, until it was 19 inches less on July 16, than it was on ~~July 18~~ June 18?

A Up to that time you are stating it correctly.

Q Does that indicate exhaustion of number 3?

A No, that does not indicate anything.

Q Why not?

A Because the figures following show that it immediately more than doubled, after the 16th of July.

Q How do you account for its doubling?

A Well, I suppose the company changed its poweror its pump, or did something; I don't know; I don't wish to account for it, because I don't know; there is no explanation in the testimony.

Q Isn't the reasonable inference that the company increased the power?

A They might have lowered the pump; or they might have throttled the discharge when they didn't want so much water.

Q Couldn't they have done the same things with the Haskell well?

A Well they could; but then if you notice, there was never a time, in all of the measurements, since 1900, when

the Haskell well ever came back to what it was originally supplying, while there are lots of times when well number 3 did it.

Q When did well number 3 ever come back to the 111 inches that it pumped in 1900?

A No, to the average of 1900, when it pumped 74.11, as an average; it has come back to that several times since 1900; and the Haskell well hasnever come back to its average for 1900.

Q The Haskell well was the only well pumped that year when the large quantities were being taken from it.

A It was, and it has also been the only well pumped many times since.

Q And the waterplane was a good deal nearer the surface then?

A That might be;

Q That is what I say; that ~~mi that~~ the waterplane at the Haskell well has lowered, and the well has declined more than the well number 3, on the average.

Q No; you say it declined more than the others.

A No, I didn't say more than the others; I said well number 3.

Q I beg your pardon; I will find your testimony that you gave yesterday on the subject; Well, proceed down on that table; take July 30, 1904: You observe it don't you?

A I do.

Q The Haskell well was pumping more than either of the other three wells that were then pumping?

A It was; but the well number 3 had doubled its output or more than doubled its output from the 10th of July,

The Sandell well [illegible] be what is the [illegible] [illegible] [illegible]

while the Haskell well had declined.

Q Those things prove your theory do they?

A They don't prove anything; they are isolated figures; the averages are what proves things.

Q Take that column right along down, and generally the Haskell well was pumping more than any other well that was pumped at all wasn't it?

A It was pumping more, because originally it pumped more than any other well, but its decline is what I am talking about; you want to confuse the quantity pumped with the decline.

Q Oh no; I am getting at the collar of your testimony that the Haskell well has declined, and shows indication of exhaustion, to a greater degree than the other wells.

A Than well number 3; my proposition is that the ratio of decline in the Haskell well has been greater since 1900 than well number 3, up to the present time.

Q You have invented that within a few minutes.

A That is what we discussed yesterday; we discussed those two wells yesterday, and we did not discuss any other wells in that connection yesterday than those two.

Q Well, I will ask your attention to that season of 1904; The pumping kept up until January, 1905, did it not, page 83?

A That seems to be so.

Q And up to that time the Haskell well had been pumped much more persistently than any other well in the whole string, hadn't it?

A Yes, sir.

Q And yet at that time, at the conclusion of the season,

while the football will not instead.

Q: Those things people thought is funny?

A: They don't press anything; they are isolated figures; the strangers are just passing things.

Q: Like that colour-right view, and generally the football will was coming more than any other will. Did you ever it all again?

A: It was coming here, because originally it seemed more than any other well. But the decision is what I am holding about; you would be surprised with the decision.

Q: Do you I am getting at the result of your hesitancy that the football will is inclined, and where indication of education, is a greater mixed than the other half.

A: That will depend if my proposition is that the rule of section in the football will then have greater chance 1000 than will change 2, or in the reverse time.

Q: Did have I mentioned that question a few minutes.

A: That is what we discussed yesterday; we discussed time two with particular, and we did not discuss any other with the that commercial probably than there was.

Q: Well, I will ask your attention to that season of 1904; the question last we until January, 1905, did it not, page 537

A: That seems to be so.

Q: And up to that time the football will had been playing such very particularly than any other well in the main strong, behind it?

A: Yes, sir.

Q: And yet at that time, at the beginning of the season,

it was pumping 70.39, which was more than either of the others except number 4, that was then pumped? Isn't that so?

A That is true, but it was pumping at a greater decline, compared with its 1900 record, than this well number 3 at the close of that season.

Q How much greater?

A Well, the Haskell well had declined 39 inches, practically from its average 1900 record, while well number 3 had only declined about 14 inches.

Q You observe that the Haskell well, although it had been pumped throughout that season more persistently than any other wells in the string, that it was pumping more on the last day of the season by nearly 8 inches, than it was pumping on the first day of the season?

A That is also true of well number 3.

Q Well number 3 did not begin to pump until the 18th of June.

A Well, it pumped more when the season closed than it did when the season opened on that well, whatever date it began.

Q But you don't see any indications of exhaustion in the Haskell well do you?

A I think so; if you go back to the record of 1900, and compare it with the figures in that table, on page 2469, you will see an exhaustion in the Haskell well- not a complete exhaustion but a greater decline than in well number 3.

Q Now, you stated a while ago, just a few minutes ago,- and I requested my associates to look up your testimony - and this may refresh your recollection: have you your testimony of yesterday before you?

A I have it here.

Q The question was put to you: "Q. The Haskell wells have been the most prolific wells that the San Antonio Water Company had there, haven't they?"

"A I don't know as they have."

And then you wanted to explain and the explanation was this: "I wish to explain that by saying that when the Haskell wells were first pumped they yielded an enormous quantity of water, something like 122 inches from one well; but that has steadily diminished; and that the wells have declined more rapidly than the others, owing to the denser formation and the difference in character.

"The Court, Q As I understand you, you are of the opinion that there is something in the nature of a reservoir along 16th street that those wells tap?

"A Yes, sir.

"Q Do you mean to say that the Haskell wells are in a different reservoir or in a branch of the same reservoir?

"A I think they are in the extreme corner of the same reservoir, but the condition of the formation is so much disturbed by the intermingling of the materials, as to make those wells have somewhat different characteristics, and the formation being so dense, and the gravel strata so thin, the supply is likely to become exhausted, and has become very much diminished by pumping."

A If you read further on, you will see that it was well number 3 that was referred to; there were no others in existence except well number 3 at that time, in 1900; if you read on you will see that I mention well number 3 as the others.

Q. I have it here.

Q. The question was put to you: "Is the material which have been the most possible which look like the labels Water Company, that there, have it there?"

A. I don't know as they have.

And then you wanted to explain and the explanation was this: "I was in Boston Harbor by saying that were the bottles which were found passed that yielded an extreme quantity of water, something like 125 inches from the wall; but that has apparently disappeared and that the wells have disappeared rapidly from the river, owing to the damage for-waters and the difference in elevation.

"The Court, A. As a matter of fact, you are of the opinion that there is something in the nature of a reservoir along this shore, that there were wells dug?

"A. Yes, sir.

"Q. Do you mean to say that the marsh wells are in a different reservoir or in a portion of the same reservoir?

"A. I think they are in the private reservoir of the water-reservoir, but the condition of the formation is so much disturbed by the indestructibility of the materials, as to make them quite very numerous different reservoirs-wells, and the formation being so dense, and the gravel stones so hard, the supply is likely to become exhausted, but the water very much diminished in quantity."

Q. If you read further on, you will see that in the well number 1 that was returned by Mr. Bates as stated in Exhibit Number 2 at that time, is this: If you read on you will see that 1 wells will number 2 as the return.

Judge Britt, You don't suppose that I referred to any other well but number 3, which was the only one in existence then, do you?

Q You were talking about decline and the probability of exhaustion.

A That is what I say, in 1900 as compared with the present time; the time is fixed.

Q In a little while afterwards you said that the recent years especially showed it.

A Yes, sir; as compared to 1900; I gave the quantity which the Haskell well pumped first

Q What did you mean when you said the others.

A Well, I couldn't state; it might have been a slip of the tongue; if you read my testimony later on you will ~~that~~ see that I specified well number 3 as the one that I referred to.

Q Well, where?

A On page 4307, the discussion is regarding the well number ~~#~~ 3 and the Haskell well, relating to this same subject; that whole page and the following page shows what we were referring to; there is not any shadow of a doubt about what is meant in that testimony, that it was well number 3; it is specifically referred to there.

Q I will call your attention to page 2477 of the transcript.

A I have it here.

Q Does that show that the Haskell well number 3 was started to pumping that year earlier than any of the others?

A I believe it shows that it was started two weeks before

the others - No, it was only started two days before number 1; the note is that number 4 started 7 a.m. 9/5/07/ and number 1 started at 6 a.m. 9/7/07; I wish to retract the statement that it started two weeks before the others; it was only two days.

Q And it was pumped that season, with more persistence, so far as the measurements show, than any other well wasn't it?

A It has one more measurement than number 1 and two more than number 4.

Q I will call your attention to the circumstance that in the year 1907, the pumping of the Haskell well rose from the first recorded measurement of 69.80, to 92.08, the last recorded measurement: Is that so?

A I see that all the wells rose that season; it was after a wet year and they all increased that season.

Q And the Haskell well rose more than any of the others didn't it.

A Yes, it appears to have risen more than either one of the other two that were pumped, number 1 and 4; number 3 was not pumped that season, so we have no means of knowing what that did do. Of the two others that were pumped that appears to have risen the more.

Q There were three pumped?

A Yes, there were three pumped.

Q Of those three the Haskell well increased more from the time the pumping began until they ceased, than either of the other two?

A Than the other two wells, number 1 and 4.

Q Do you ~~xxxxxxxx~~ infer from that circumstance that the

Haskell well was becoming exhausted?

A I don't see where that throws any light on the subject; I was discussing as a comparison, as between number 3 and the Haskell Well, and well number 3 does not appear that year.

Q You were discussing the other wells as a group.

A I was not discussing the other wells; they did not exist in 1900; I was discussing well number 3 as compared with the Haskell well; you are basing this whole discussion on the occurrence of that plural in the transcript instead of the singular, and I think that is a pretty thin theory to base it on. I think it is perfectly apparent from the transcript that it was number 3 that I was referring to; it was the only one in existence in 1900; I may have expressed myself that way because number 3 is in the group with the others, in the same formation, but I certainly was not referring to any wells that did not exist in 1900.

Q Well, in 1907, well number 3 was not pumped at all: Would you derive the inference from that that number 3 had become exhausted?

A No, I would not, because the following year it was pumped and pumped large quantities of water.

Q If it had not been pumped the next year you would have drawn the inference that it was extinct?

A I would not have drawn that inference, but the inference might well be drawn by some one wishing to strain a point, and strain it in that way; I am only drawing my inferences from the figures and I am not drawing them from things which do not appear.

Basalt cell was invading primarily?

A. I don't see where that throws any light on the subject; I was discussing an a priori, or deductive, method I and the Gamma Cell Cell, and will demonstrate I have not already done.

Q. The area discovering the minor cells was a group.

A. I was not discovering the minor cells; they did not exist in 1800; I was discovering cell number 3 as compared with the basal cell; you are making into minor discoveries on the movement of that planet in the terrestrial instead of the singular, and I think that is a purely side issue; I have it so. I think it is perfectly apparent from the testimony that it was number 3 that I was referring to; it was the only one in existence in 1800; I may have an phrase myself that my reason number 3 is in the group with the others, in the same formation, but I maintain was not referring to any cells that did not exist in 1800.

Q. Cell, in 1800, cell number 3 was not proved at all: Would you derive the deductions from that that number 3 had been established?

A. No, I would not, because the [illegible] gave it was proved and proved Tiage quantities of cells.

Q. If it had not been proved the next year you would have drawn the inference that it was wrong?

A. I would not have drawn that inference, but the inference might well be drawn by some one trying to create a point, and though it is that way; I am only drawing my inference from the figures and I am not drawing them from taking what is not proved.

Q Look at page 4305, the testimony you gave yesterday, line 17:

"" Don't you know that the water-plane at the Haskell wells is as high as at the other wells, relatively to the elevation at which it stood when it began to be pumped?

"A I have not compared that.

"Q Don't you know it does not differ in that respect?

"A I would have to look that up, Judge Britt; I have not compared that; I have not made that comparison but I haraly think it is as you say; my opinion now is that it is ~~xxxx~~ not, although they have been pumped a good deal less the last few years than the other wells.Z"

A That refers to another matter - the elevation of the water?

Q We were still talking about the same matter, the decline.

A We were talking about the wells in one waterplane as compared to the wells in another.

Q You were talking about the Haskell well, and about the exhaustion of the Haskell well.

A I don't think I need to discuss this with you; we were speaking of the waterplane at this and the other well, not the quantities pumped.

Q You say you were discussing only the elevation of well number 3?

A No, I wasn't speaking of elevation.

Q What were you talking about?

A If you will please be fair, and confine yourself to one thing at a time; we were discussing first the decline comparatively in well number 3 and the Haskell well, in 1900

compared with recent years; that is what we were discussing first; afterwards you brought up the subject of the water-plane at the other wells, and we discussed that for a while.

Q. You say we were first discussing the comparative decline of the Haskell well, and well number 3, in 1900 - where were we discussing that first?

A. We first began to discuss that, at the page you read originall I think.

Q. Was there anything said about 1900 there?

A. On page 4304 we began to discuss that.

Q. Take the page I first called your attention to.

A. That is page 4304; I gave the first measurement of the Haskell well in 1900.

Q. There is number 3 mentioned there?

A. It is not mentioned on that page.

Q. There is 1900 mentioned there aside from that measurement?

A. The measurement there is the first measurement that I made in 1900 of the Haskell well. Then on page 4307, you again went back to this subject, after talking about the water plane for a while, and you will see there that the well number 3 is specifically mentioned, and the year 1900 is mentioned.

Q Has the water plane anything to do with the decline of the elevation of the water plane?

A Well, it has a bearing; but a well may decline more rapidly than the water plane indicates. The formation has equally as much to do with it. The water plane is one factor and the density of the formation is another. I think it is idle for us to discuss this ancient testimony. Anyone can read it over and see what it means/.

Q I think so. I will call your attention to one more circumstance and then we will pass from this. Look at page 512, if you please.

A I have it.

Q You find there that the Haskell well no. 8 was pumping June 23, 1903, 91.2 inches.

A I do.

Q Look at page 2477.

A I have it here.

Q Do you observe that that same well was pumping December 14, 1907, 92.08 inches?

A Yes; there you are, with your isolated figures again. Why don't you take averages? I based my conclusions on averages.

Q Take the averages for 1901.

A You have only one measurement, so there is no average to it.

Q You have based several assumptions on single estimates or measurements for the year?

A Where?

A

Q In your statements here about the output ofwell no. 3 -- or rather without any measurement at all. In '98 you said it was 30 inches; in '99 that much ormore.

A Did I testify that it was 30 inches in 1898? I don't remember testifying. I wasn't there in 1898 and have no knowledge.

Q You make that the basis of your assumption and therefore that it was your conclusion.

A I adopted the testimony of other witnesses in a calculation. That is a different thing from testifying to a fact.

Q At any rate, the fact is that in the beginning of the season, 1903, the beginning of the pumping season, the output of the Haskell well no. 8 was a trifle less than it was at the end ofthe season in 1907. That is true, isn't it?

A If you take those two measurements, that is true; but it is not as much as the average for 1907.

Q And that indicates, does it, that the Haskell well will probably become exhausted?

A No; that doesn't indicate anything. All that it indicated is thatn if you take all the measurements of the Haskell well and well no. 3 from 1900 to thepresent time the Haskell well has declined more tha well no. 3, and that is all that is indicated and all that I have ever claimed.

Q You have stated here, as I understand you desire to be understood, that the wells 1 to 6 of the 16th Street wells

Q: Do your statements imply about the original Orwell so, 2 -- or rather Orwell's day-to-day, in all. In the pre-war it was 20 years; in '70 was such events.

-A: This I really don't. It was 35 years in 1949! I don't remember exactly. I wasn't born in 1920 and lived in Jamaica.

Q: You made this the basis of your knowledge and belief from book it was your conclusion.

A: I adopted the sentiment of other witnesses in a situation. That is a difficult thing from verifying it in fact.

Q: As my view, the fact is that in the beginning of the season, 1920, the beginning of the original season, the attack of the Orwell will on. It was a brilliant idea that was as the end of the season in 1970. That is true, isn't it?

A: If you have those my conversations, that is true; but it is not so and at the beginning (in 1970).

Q: And that involves, does it, that the Orwell will will probably become educated?

A: Yes; that seems a little so-fetch. It is not it impossible in that if you take all the mainstream of the Orwell will and will so. I from 1970 to discussed the the Orwell will-has finished now the will so. I, and then in all this is indicated and all that I have ever learned.

Q: Yet your point here, is I understand you though so is unchanged, such the which I to a of the 1970 where will

of the San Antonio Water Company are in close sympathy with eachother?

A 1 to 6? No. I know nothing about no. 6; I have had nothing to do with that well; and since I made this investigation in the case, it has been caved in and not pumped, and I have excluded that from all my statements. I said wells 1 to 5; that they are in very coarse material and in some sympathy.

Q In some sympathy?

A As much as the material permits.

Q Have you been looking it up over night?

A Looking up what?

Q The extent to which they have been in sympathy.

A I haven't been looking it up at all.

Q Now then, you speak about well no. 3 and your wanting to confine your comparison with the Haskell wells to a comparison with no. 3. If those other wells are so closely in sympathy with no. 3, may not a comparison be made as justly with 1, 2, 4, and 5, as with no. 3, on the theory that if things are equal to the same thing they are equal to eachother?

A I would say no, because the other wells may be in slightly different formation than no. 3. No. 3 I am familiar with, having been connected with it from the early days when it was first drilled, and I know its condition. The other wells, all I know about them is what is in the record here, which everybody else knows. And I am free to state that I made no definite comparison between those wells and the Haskell wells or among themselves, and I don't

like to express an opinion on that subject till I have made some comparisons. If you want an opinion I wou dlike till to-morrow morning to make a comparison.

Q You have already st ted t t they are in close sympathy.

A Not close sympathy. Don't put words in my mouth. I said they were in some sympathy, probably, from the figures in the case; but how much, I haven't stated and I have made no figures on the subject. A nd if you wish an opinion I would like to have time to prepare it, because thi s opinion I prepared after due consideration, and I would like to have the same time to prepare this before submitting it.

Q I am not calling for an opinion, and it doesn't need time for reflection. If they are in sympathy shouldn't a comparison between Haskell well and well no. 3 also reasonably extend to a comparison between the Haskell well and those ot er wells with which well no, 3 is in sympathy?

A No; because the comparison would depend on the degree of sympathy among all of these wells; and in order to determine the degree of sympathy, you have to have time to consider it and examine the figures; and I cannot as an engineer come here and express opinions on matters which I have not carefully considered from the standpoint of the figures nefore making up my mind.

Q Are you still of the opinion that there is any sympathy between wells 1, 2, 3, 4 and 5?

A That there is some sympathy, yes. I think there is some sympathy; but how much, I am not prepared to say till I have again gone over the figures.

Q How is sympathy manifested between wells?

A It is manifested by showing a greater decline in one well when another well is being pumped than you can attribute to natural causes.

Q That is one mode of proving sympathy .

Q Is that the only mode?

A There may be other modes, like chemical tests and placing a chemical of some sort in the bottom of one well and having it pass to another when you are pumping the otherwell. For instance, I have done that in some cases--

Q That is sufficient. I want to ask you if it may be shown also by the rise in two wells when you have ceased pumping another.

A Yes; if the rise in the well which is not pumped when you cease pumping the other is greater than you can explain by natural causes like rainfall and other causes existing in the neighborhood, that would be one factor in proving sympathy. You have to consider all the factors, both as to geology. other wells which are pumped in the same neighborhood, the climatic conditions etc. when you determine sympathy. You can't build a theory on just one factor.

Q Do you think that pumping one well out of several or a number of wells less than the whole numberin a particular district, tends to lower the water plane in the whole district and so, of course, producing a lowering of all the wells in the district?

A That is true in some districts where the formation is porous and of the same geological formation and which

may be close enough so that the cone of depression communicates its influence to all limits and all parts of the district. But in other places where the resistance of material is different and the geological formations are different, the reverse is generally true. In fact, it is always true.

Q What do you call the reverse?

A That is, that the pumping of one well in that district or area would have no effect on the other wells in that district or area.

Q Now, sir , you have stated here that that water in the neighborhood of the 16th Street wells is moving, not toward the Cucamonga Springs, but is moving to the southwest.

A I have so stated.

Q Inclusive of the water of the Haskell wells.

A The Haskell well water

in a state of nature is any such condition that I have not expressed an opinion that it moves at all. If it moves at all, I suppose that it where it moves to. But the water plane has so little slope there that you cannot determine. By examining the topographic chart and the contours, the most reasonable inference in regard to the Haskell well is that whatever movements there are in the waters at that point is towards the southwest; but I doubt, in a state of nature, whether there was any movement at that point. I think that is what we would call dead ends of the strata.

Q That is due to the imperviousness of the strata?

A That is due to the intermingling of the material of

~~the material~~ from the Red Hill with the recent formation, and the eddy formed when the channel turned that corner of the dike and deposited a finer material.

Q What sort of a channel?

A The recent channel of Cucamonga Creek when it was depositing the recent alluviums.

Q Over what depth?

A All we know of those recent alluviums is that they are very deep. The 16th Street wells have shown them to be of a depth at some points--

Q I am asking about the Haskell well.

A All right; I will confine myself to that point then. Well no. 7 is 649 feet deep, and all in the recent alluvium.

Q Howdeep is no. 8?

A I don't know no. 8. I have no means of telling. May be I can tell from Mr. Trask's exhibit. Mr. Trask gives that as about 620 feet, which is less than well no. 7. On exhibit K that information is given. The cessation of movement in connection with that intermingling of material must be, in your view, due to the greater imperviousness of those materials.

A That is true. It is due to the greater preponderance of fine material as compared with the coarse.

Q How does that motion square with this ascertained productivity of the Haskell wells? This is a mere parenthetical question, because it comes in with something else.

A The motion in a state of nature has a bearing on that subject, as the water plane above, if it were in contact with other strata which are there, although the at

strata are narrow (that is, the gravel strata are narrow) they would still have the benefit of the whole gravel reservoir if they are in contact with it and connect with it at higher points, which is my opinion.

Q Where?

A Taking defendants' exhibit F, my opinion is that the haskell wells, the coarse strata and recent alluvium intermingled with the fine from the Red Hills point toward the northwesterly into the gravel reservoir, and at th point where the finer ones pinched out the coarser ones received their water supply which fed in under the full pressure of the gravel reservoir. But in a state of nature, there being no outlet to these dead ends to the southwesterly or anywhere else, the water would be in a quiescent state. But the moment you begin to draw on it you introduce a velocity from the northwest toward it and receive water.

Q Then the strata of water bearing material in the Haskell well are continuous with those that you call the gravel basin to the north and northwest?

A I think they connect wit the main gravel reservoir to the northwest. It may be a mile or two, but they connect at some point.

Q And he same strata which supply wells 1, 2, 3, 4 and 5?

A The same ge eral reservoir or gravel basin.

Q Now you have stated here that tho movement of percolating water underground is at right angles with the slope of the water plane.

A A t right angles with the contours of the water plane.

Q Take volume 1, if you please, and I ask your attention to page 88.

A I have volume 1 here.

Q Now sir, I ask your attention to this table of water elevations found on page 88, and you observe that at that time the first measurement, January, 1900, that well no. 3 was 1402.9.

A I do.

Q And that well no. 6 was 1396 feet.

A I observe that.

Q But well no. 6 is directly east from well no. 4, or almost so, isn't it?

A It is to the east from well no. 3.

Q Doesn't that indicate that the water slopes from well no. 3 toward well no. 6?

A Yes; it indicates that the water plane slopes some in that direction; but it does not indicate that that is the greatest slope of the water plane. Two measurements of that kind indicate nothing as to contours.

Q Come down to April 11, 1904, which is a time before there had been any considerable pumping that year, as appears by reference to the table at page 82, that no. 8 began pumping May 19. You observe that the water plane at well no. 1 was 1366.3 feet and the wells further east showed a diminishing elevation?

A I observed that. I observed that before. But that does not demonstrate which way the greatest slope of water plane exists or where the contours lie. The contour maps that we have,

one made by intervenors and the other made by the government, show that.

Q Isn't this an indication that the contour is at that point?

A It is a factor, but it doesn't go to the question you are seeking to solve. You have to get intervenors exhibit no. 2 or my exhibit Z-9 in order to show the contours.

Q I propose to show from these elevations what the contour is.

A You will have to do it yourself then, or give me a piece of draughting paper and instruments and let me draw the contours. You can't show it by reading the figures.

Q ~~Page 11~~ April 11, 1904 the water plane shows there in these wells a steady descent towards the east?

A It shows some descent towards the east.

Q On April 28 is it the same thing?

A I believe that is always the condition, Mr. Britt; when the wells are not being pumped there is a slight descent to the east, if you take that course or direction. But that doesn't have anything to do with the direction in which the waters percolate. The water percolates down the greatest slope and it always takes the greatest slope of the water plane, and you can make from that any other number of slopes having a lesser degree of declivity; but the water does not move along the lesser slopes, but along the greatest slopes as shown by right angles to the hydrographic contour.

Q Do not those figures indicate a movement of the water there, whether it be southeast or east-south-east or south-

south-east? Doesn't it indicate a movement there in an easterly direction?

A No, sir; they do not indicate that.

Q Then the slope of the water plane as ascertained from those figures don't indicate any slope of the water plane?

A They indicate some slope of the water plane, but the movement is along the course of the greatest slope of the water plane.

Q Suppose these were the only figures you had on the subject: Would they indicate an easterly trend or direction of movement of the water?

A They wouldn't indicate anything. I wouldn't want to form an opinion on as few figures as this.

Q You wouldn't have an opinion with eight wells in a string?

A No, sir; not without wells further to the south and southwest and other directions, to see if there was a greater slope in some other direction.

Q Don't you have plenty of those in the direction of Cucamonga Springs? The Hellman well no. 2 and the Cucamonga Springs themselves?

A Those are in a different formation and another character of wells. I couldn't form any opinion as to the slope of the water plane by getting artesian wells and connecting them with the surface wells. If you attempted to do that you would be up in the air all the time. You might try that in the San Bernardino Valley and see where you will land

Q Suppose that instead of inverting your just and rational

[illegible] wouldn't it [illegible] is an easterly direction?

A. No, sir, [illegible].

Q. [illegible] Figures [illegible] indicate [illegible] of the [illegible] [illegible] the [illegible] of the [illegible].

Q. Suppose those were the only figures you had on the subject; would they indicate an easterly trend or direction of movement of the water?

A. They wouldn't indicate anything. I wouldn't want to form an opinion on as few figures as those.

Q. [illegible] eight wells in a circle?

A. No, sir; [illegible] wells further to the north and [illegible] their directions, [illegible] greater [illegible] in [illegible] directions.

Q. Don't you have plenty of cases in the formation of [illegible] the [illegible] to [illegible]?

A. There can be a different formation [illegible] walls; I wouldn't form any opinion as to the slope of the water [illegible] the surface water. [illegible] you might be [illegible] the [illegible] time. [illegible] that in the [illegible] valley and [illegible] you will [illegible].

Q. Suppose [illegible]

proposition that you would say that the elevations of the well indicate the slope of the water plane, instead of inventing a hypothesis that they are in a different formation --

A I haven't invented any hypothesis. The facts are there; the intervenors have recognized it and the government has recognized it and I have verified it, and the whole thing proves what I say. There is no hypothesis about it

Q Will you instead of referring to these other exhibit, refer to these tables before you?

A I want you to understand, however, that if you want me to draw complete deductions from this partial array of figures, and draw them to the hypothesis that you are asking, you will be disappointed. I haven't taken one set of figures but all the figures and all the facts, and that is the only way in which I can draw a deduction, and I have shown those on the maps to make them intelligible to everybody.

Mr. Britt: I ask that the statement of the witness that he has put them on the map to make them intelligible be stricken out because it is not responsive and because the Court knows by this time that the witness partial statements and partial facts on the maps right along.

The Court: Stricken out as not responsive.

Q It is a fact that these tabulations of water elevations, not only those found at page 88 but those found at page 2543, and the tabulations of water elevations given by Mr. Trask for the year 1907, the page of the record of which I haven't here before me,-- that those do uniformly show the

slope of the water plane along the line of the 16th Street wells, including the Haskell well, when they are undisturbed by pumping, from the west toward the east?

A The way those wells happen to be drilled there is a slight slope in that direction. But if you consider other wells in the locality there is a greater slope in the other direction, which upsets the theory that the water flows along that slope in that direction.

Q What other wells are there?

A Take the experimental shaft no. 4 which was sunk by Mr. Trask; the Bourwine well; and then you come down--

Q What other wells of which you have elevations of the water plane?

A I am giving them as fast as I can. Then you go over into the Ontario colony--

Q Are you going away over there?

A I am going in the direction in which the water is moving, taking all the wells of which we have a record in the case, andthey will show the movement of the water plane toward the southwest.

Q Tell us which ones.

A I am telling you which ones. The experimental shaft no. 4-- the Bourwine well.

Q Point out to the court where it is situated.

A They are not shown on that map; they are shown on this one. Experimental shaft no. 4, shown on Exhibit D and so marked on that exhibit in close proximity to 16th

and southwesterly from well no. 1

as the distance from the well no. 1 to experiment-

al shaft to which you refer.

A It is not far from 2000 feet southwesterly and about 600 south..

Q It is more west than south?

A Yes.

Q Tell us how much west and how much south.

A I have just stated that it was 2000 feet west and 600 feet south. I didn't give the direction in a straight line, but I gave you the two components of the direction.

Q The hypotenuse of the triangle would give it exactly?

A Yes, sir.

Q That is the first well on which you are assuming the trend of the water plane. Where is the next one?

A The next one is the Sourwine shaft which is marked in section 5 on this map on the easterly line of the Ontario Colony lands.

Q Give us the distance, if you please, west and south from the well no. 1 of the San Antonio Water Company.

A The Sourwine shaft is located as nearly as I can make it on defendants' exhibit D, 3300 feet south from well no. 1 of the San Antonio Water Company .

Q What is the next well?

A The next well that has been shown is the Stewart well, marked on Exhibit D at a point on Fourth Street west of Mountain Avenue and marked with a dot and "Stewart Well" in pencil.

Q Give us the distance south and the distance west of that well from well no. 1 of the San Antonio Water Com-

pany's 16th Street string.

A The Stewart well is located 16,500 feet south of well no. 1 of the San Antonio Water Company and 12870 feet west from well no. 1 of the San Antonio Water Company.

Q What other well have you?

A The King well.

Q Give us the location of that.

A I will have to ask Mr. Trask to locate A Street before I can do that.

Q Mr. Trask, will you lend us your assistance for a moment? (Mr. Trask locates A Street on map.)

A I find that the King well is marked on Exhibit D by whoever made that map at the correct place.

Q Give us the distance of the King well south and west of the well no. 1 of the San Antonio Water Company's 16th Street wells.

A I find by measuring on exhibit D that the distance from well no. 1 of the San Antonio Water Company to the King well is 12780 feet west and 21780 feet south

Q Can you say what is the elevation of the surface of the ground at experimental shaft no.-- the one 2000 feet west and 600 feet south of well no. 1.

A I will examine my notes and see. I find that I have no note of that. Mr. Trask has the note. I have the elevation of the water plane in 1890 as deduced from Mr. Trask's measurement, and I think he has testified to the elevation of the surface.

Q In 1890?

A In 1890. 1410.5 is what I figure the water plane is.

[illegible]

Q. The [illegible] is [illegible] [illegible] [illegible]

If I remembered the depth to water I could get the surface; but I don't remember the figures-- Possibly I have them. I will see. No, I will have to consult some other records which I have at the hotel before I can give you the elevation of the surface.

Q What other well besides those four that you have mentioned that you referred to for the establishment of this slope of the water plane.?

A Sourwine shaft marked near Station 2 of the Cucamonga Ranch, being near the word "Colony" in the title of the map, marked "Sourwine Shaft" with an arrow pointing to a rectangular figure.

Q Give us the distance of that last Sourwine shaft west and south of the well no. 1 of the San Antonio Water Company.

A That second Sourwine shaft on the west side is 990 feet south of 16th Street well no. 1 and 9890 feet west of that point according to the scale of Exhibit D.

Q Is there any other wellx besides those five which you used for that purpose?

A Experimental shaft no. 3 and the Frankish & Stamm tunnel, giving water levels in that.

Q Give us the distance and direction.

A The distance from well no. 1 of the San Antonio Water Company north to experimental shaft no. 3, and that may also apply to the general locality of the Frankish & Stamm Tunnel, is 11880 feet, and the distance west is 2600 feet.

Here the Court takes a recess until two o'clock p.m.

[illegible]

[illegible]

[illegible]

AT EXAMINATION:

Mr. Britt: The last well or excavation which you referred to was that experimental shaft in the neighborhood of the Frankish and Stann Tunnel, and your statement was that the and your statement was that the Frankish and Stann Tunnel might be understood to be about the same distance and about the same direction from well no. 1. I may say here that in endeavoring to locate these wells which you take into account for this purpose, that I am not inquiring about the San Antonio Tunnel or any other remote excavation which may be referred to here for the purpose of argument to sustain one or the other geological hypothesis, and I don't want to consume time in getting those remote wells which have furnished a basis of one kind of an argument or another. But with this suggestion I will inquire of you what other wells are you relying upon, having rejected the 16th Street wells, as indexes of the slope of the water plane, having given us these four or five other wells scattered over the country for five or six miles? What other well are you relying upon to indicate the slope of that water plane which ispenetrated by the 16th Street wells as toward the southwest?

A First, before giving the otherwells, I would state that I am not rejecting the 16th Street wells; I am making them a part of the whole data relating to all the wells, and taking them altogether in drawing my conclusions. The next one I take into account is what is known as the Jordan well, which is located on defendants' exhibit D and marked Jordan wells with two dots, and the one I refer to is the

westerly one of the two dots as being the next well that I took in connection w h this subject.

The Court: Why don't you consider the other Jordan well?

A It is only 35 feet deep and this other one is 118 feet deep, and the 35-foot well does not throw any light on the subject.

Mr. Britt: The Jordan well to which you refer was the subject of some observations which you testified to yourself?

A I did.

Q And I think you observed it more than once.

A I did.

Q What were your observations on the depth of that well and the dates?

A My first observation was on the 15th day of January, 1899, when the depth of the Jordan well from the surface of the ground to the bottom was 118.4 feet and the well was dry. There was no water at that elevation. The next observation of the Jordan well was on the fourth of February, 1900, at which time the well was 118 feet deep and still no water. It filled in .4 of a foot between the two dates.

Q That was the last one?

A That is the last observation on that well.

Q Parenthetically there, wasn't there another well near by or a little way to the east called the Riche well,?

A No; that is over by the winery; between the winery and the bridge.

Q That is not very far to the east of the Jordan well?

A It is on the other side of the Red Hill. I have notes of that well if you wish them.

Q Have you notes of the Riche well.?

A Yes; but I don't consider that as bearing on the water plane on the west, as it is in another locality.

The Court: Q Is that located on this map?

A I don't know. No, the Riche well is not located on this map.

Mr. McKinley: It is located on this one, isn't it?

A Yes; it is located with a square marked elevation 1257, south of the San Bernardino road in the angle of the road on the east side of the ~~road~~ Red Hill on plaintiffs' exhibit 1.

Mr. Britt: Give us, if you please, your observations on that Riche well.

The Court: There is an intimation that there are two Riche wells. We ought to know which one he is referring to.

Mr. Britt: I was unaware that there was more than one.

A There is only one that is now--

Mr. Britt: Mr. Wright and Mr. Trask say they don't know of but one.

The Court: Somebody at the board said something about it.

A There was only one in existence when I made these observations; whether there were two before that or not I don't know of personal knowledge. I have heard it stated that there was another one at one time, but this one is the only one in existence at that time.

Q You refer to theone which is indicated on plaintiffs' exhibit 1 about the northwest corner of the little square

ortrapezoid marked "Riche Place"?

A I am not sure that that is where this well is located. My recollection is that the well I am speaking of was located near the road.

Mr. Waters: When was it? You know that road has been changed. The San Bernardino road? This was when?

A This was in 1899. It was located right near the road.

Mr. Waters: The road used to run by the winery, but it runs two or three or four hundred feet north.

A I wouldn't wish to testify to the exact locality of that well, as I have a note here of two wells in that general locality, under date of December 13, 1899; I have a note of two different wells in that same locality. The notes I have show that there was one dry well caved in at the bottom and just west of the winery; less than 150 feet to the cave in the well.

Mr. Britt: Q What date was that?

A December 13, 1899.

Q That, obviously, is not the Riche well to which your attention has been directed on these maps a moment ago.

A I say that my recollection is that there were two wells but one had filled in entirely and the one I measured had caved in so it was only about 150 feet deep. That is all the recollection I have on the subject.

Q At this place west of the winery?

A Yes; the notes show that the well I refer to was just west of the winery.

Q Was there any water in it?

A No water in it; it had caved in. I never was there when

there was water in it.

Q Now you say there is another well which you made observations on.

A I made no observations, but there had been a well which had been completely filled, and fortha t reason no observation was made on it.

Q Where was that?

A It was near that same locality; but just where, I can't say. there was no survey made of these wells. I simply made the notes on the ground and described the one I mentioned as just west of the winery.

Q Now in regard to the one that was completely filled up.

A I have no note in regard to that. ~~x xxxxxx~~

Q And this well which you mention as being 150 feet deep or something like that or less than that, and caved, might or might not have been the so-called Riche well?

A It might or might not, so far as I knowpersonally.

Q And youmsay it was less than 150 feet deep: Didyou pu t a plumb line down to see?

A I evidently did, from the notes which I have here; because the notes read that it is less than 150 feet on accounta of caves. That would mean a fraction of a foot less. If it had been 149 feet I would have said so.at the time. 150 feet, may be, is taken as the nearest foot.

Q It was more than 149 and less than 150?

A I should infer that from the notes in the book. My recollection of the depth is refreshed by this note made at the time, and that is all I remember about the

[illegible] [illegible] to it.

[illegible] [illegible] [illegible] [

depth at this time.

Q Did you ever measure that well afterwards or observe it at all?

A No; I never observed that well again. It was not in existence and I never went to it again and I have no notes regarding it.

Q It was on the east side of the Cucamonga wash.

Q Now, returning to the Jordan well, give us, if you please, the distance of that well both north and east or west, as the case may be, from well no. 1 of the San Antonio Water Company on 16th Street.

A That according to the scale on exhibit D is located south 6930 feet from well no. 1 and east 990 feet from well no. 1.

Q What other well or excavation do you rely upon as showing the trend of the water plane to the southwest?

A Another well which was excavated at the south end of the little Red Hill and known as well no. 18 in the McPherson case, and is situated in the neighborhood of the former site of the Tiburcio Springs.

Q Has that well any existence at the present time?

A I am unable to state.

Q Give us what observations you have on that well.

A It is known as the Tiburcio Springs shaft and it was on the 4th of February, 1900, when there was 20 feet to water from the top of the curbing. The curbing was about the surface of the ground.

Q What was the depth of the well?

A No note regarding the depth of the well. I don't know

the depth of it. It was a shallow well; it was only a shaft.

Q Did you ever make any observation on it afterwards?

A I never made any more observations on that. I am quite sure it was filled up before 1904 when I went again to that locality after the McPherson trial.

Q That is all the information you have about that well?

A That is all the information except the level of the surface at that point.

Q What was that.

A 1311.3 feet above sea level.

Q What other well?

A There was a well near the end of thewest branch of the Eady Tunnel, a branch which I have referred to formerly in my testimony as being from a shaft near station 20 on the tunnel and running west for some distance, and in which the top of the formation and the contact between the two formations is found.

Q What do you designate that well? Was that at the end of a lateral shaft?

A Yes; just beyond the lateral shaft. It is the well referred to in the McPherson case as well no. 38 on exhibit 12.

Q Have you described the well in this case?

A I have not.

Q Where was it situated with reference to that lateral shaft?

A If you will examine exhibit 81 in this case, I think that shows it. I believe you copied it from the tracing of that exhibit. It is called "well. 1350" on exhibit 81

in this case, being just west of the end of the tunnel shown here.

The Court: Q Do you know whether that has been referred to by any of the other witnesses?

A I don't recollect that it was referred to by any other witness in this case heretofore. It was referred to in the McPherson case repeatedly.

Mr. Britt: Q What observations have you on that well?

A I have nothing excepting the recollection that there was no water in the well on a level with the branch of the tunnel. As to whether there was any below or whether the well extended deeper, I have no observations of my own. All I know about that excepting that the water was lower than the level of that branch of the tunnel would be hearsay.

Q On what date did you observe it?

A That was observed on March 15, 1899.

Q You have not testified to it heretofore.?

A I have not, because I didn't measure the depth of the well or the depth to water. I simply went into that drift and there was no water in the well up to the level of the drift; and any other fact I know nothing about in connection with that well. And the only way in which I know there was no water in the well up to the level of the drift was that I was in the drift and it was dry; and if there was any water in the well there would also have been in the drift.

Q That doesn't necessarily follow.

A That was my deduction. I don't know whether you would agree with it or not.

Q Do you know whether it was a bored well or a shaft?

A It was a bored well.

Q Did you take any observations to see what was the depth of the well or the depth to water?

A On the 15th of March, 1899, I had so many things to do that I didn't have time to make observations on everything, and I only took those things which were most important to the subject which I was then investigating.

Q Did you ever observe it afterwards?

A Afterwards I wasn't able to observe it; but I am of the opinion that it was filled up or destroyed. I find no reference to it in my subsequent notes.

Q Do you know whether it was caved in at this time, on March 15, 1899?

A No; I do not.

The Court: You say it was a driven well?

A Yes, sir; there was casing in the well.

Q Was it cut into the well?

A No; the tunnel had not been extended to it. There was a shaft from the tunnel to the surface at station 20, and then a drift running west towards this well from the shaft, and I went into that drift; but the drift did not extend to the well.

Mr. Britt: You don't know then whether there was any water in the well or not?

A The only thing I have is the deduction that the tunnel was dry at that level and probably the well was. Now that is all I know about it.

Q You referred to this branch or lateral tunnel.

A I referred to this lateral tunnel being dry. There was no water rising in it at that point.

Q What was the elevation of the surface of the ground where the well that you have last mentioned was, as compared with the elevation of the floor of this lateral tunnel which extended out towards it from the Eady Tunnel?

A I figure that out as 70 feet by taking the difference of the two elevations as I have them. The elevation of the well is shown as 1350 on exhibit 81, and I calculated the elevation of the tunnel floor at 1280, and the difference would be 70 feet.

Q That well does not afford any more evidence for deduction than the floor of the lateral tunnel?

A I don't think it does. But you were inquiring about wells, and therefore I gave wells instead of the tunnel.

Q Without being interrogated on each one separately, will you proceed and give the last of the remaining wells and excavations which afford you this data upon which you assert that the water plane's trend where the 16th Street wells or San Antonio Water Company's wells are situated, is to the southwest?

A With the exception of a drift in that tunnel I have nothing near enough to come within your former scope. I know more wells further west in this watershed, but they are not near enough to this locality, according to your statement regarding the Frankish & Stamm tunnel to be of assistance to you.

Q West of Ontario were they? Well, state what they are.

A There are three wells, one known as the 22nd Street

well-- the 22nd Street Bodenhamer well, and the other known as the 21st Street Bodenhamer well, and the third is one that is known as the Saunders well in that same locality.

Q The first one you called what?

A The first one I referred to was the 22nd Street Bodenhamer well.

Q Give us the same data about that well which you gave as to the others. That is, the distance in both directions, north and west of the well no. 1 of the 16th Street wells.

A Those are not located on the map as yet and I am not sure that I could locate them. I think Mr.Trask would have to locate those three wells on the map.

Q Well, if Mr. Trask will--

A The only one located is the 21st Streetwell to which Mr. Trask hasx testified.

Q Mr. Trask being present, we will ask him to locate the so-called Bodenhamer well on the map exhibit D. State, Mr. Trask, where you have placed it.

Mr. Trask: The Bodenhamer well on ~~21st~~ 22nd Street I have placed at the intersection of Mountain Avenue and and 22nd Street. I have shown a round dot there and marked an arrow to it with the word "Bodenhamer" written on the map. The Bodenhamer well on 21st Street is shown by me in my former testimony .

Q The 22nd Street well is close to the intersection of Mountain Avenue and 22nd Street

Mr. Trask: Yes, sir.

The Witness: The Saunders well, Mr. Trask, also located that.

Mr. Trask: The Saunders well is east of the 21st Street Bodenhamer well and distant about from three to five hundred feet east, and would be just south of 21st Street and east of Mountain Avenue. I have marked that on the map with a circle and written opposite to it the word "Saunders."

Mr. Britt: And I think Mr Finkle mentioned another one.

A Those are the three in that same general locality.

Q State now their respective distances from well no. 1 of the 16th Street string of the San Antonio Water Company.

A The Saunders well is located 11550 feet west from the San Antonio Water Company's well no. 1 and 5540 feet north of that well, according to the scale on exhibit D. As to the Bodenhamer well on 21st Street, it is located 500 feet west of the Saunders well by a measurement which I made myself. That would be 12,500 ~~12050~~ feet west of the well no. 1 of the San Antonio Water Company and 5540 feet north of that well. The 22nd street Bodenhamer well is located 12045 feet west of the 16th Street well no. 1 of the San Antonio Water Company and 6860 feet north of that well, according to the scale on exhibit D.

Q That completes the list, does it?

A That completes all the wells of which I have any personal knowledge which have a bearing on the percolation of water on the west side of the Red Hill.

Q You know the question I have been asking is about wells which have a bearing on the percolation of water where the 16th Street wells of the San Antonio Water Company are situated.

A That is what I mean. They are on the west side.

Q Now in these several wells that you have been describing, I suppose you have some observations of water appearing in them at some depth, observed by you?

A Some by myself, and some are testified to by others in the case.

Q Have you those water elevations collected together?

A I have them collected together; yes.

State them, if you please.

A Beginning with the Sourwine shaft which is on the east side of the Colony Lands and near the Red Hill in section 5--

Q That is the one that is indicated as somewhat to the northwest of what is called the little Red Hill?

A Yes. And in that Sourwine shaft from the first observation which I made of water, on January 15, 1899, the elevation of the water plane at that date was 1176 feet.

Q You had better give all the observations which you made on those wells as you made them.

A There was only one more observation. On March 15 it was practically the same thing. March 15, 1899. That observation would give the elevation of the water level in the well as 1176.5, only .5 higher.

Q How do you make that computation?

A By taking the level of the well at the curb from the bench mark which is 1360.7, and deducting from that the depth which I measured to water.

Q 1176.5?

A On March 15, 1899.

Q Depth to water how much, from the surface?

A Depth to water ~~in the~~ from the surface, I have already testified in the case, 184.2 from the top of the curb.

Q Was that on the last date or the first?

A That was on the last date.

Q Did you ever have any subsequent observations of that well?

A Not the water. The next observation I made, the well had caved in and I have no further observations to water.

Q When was that?

A That was December 13, 1899, when the well had caved in so it was only 162 feet from the top of the curb to the bottom of the well.

Q That is the last observation you ever made there?

A Yes; that is the last I ever made there.

Q Take the next one.

A The next one that I have in my list is well no.18 as I call it, or the shaft near the southeast point of the little Red Hill; in the vicinity of the former Tiburcio Springs.

Q Where you told us it was 20 feet from the surface to water?

A Yes, sir. Now the elevation of the top of the curb was 1311.3, which would make 1291.3 as the elevation of the water surface at that point.

Q And 20 feet to water?

A 20 feet to water.

Q Was that the last observation you ever made on that?

A That is the last one I ever made on that. That obser-

vation was made in the early part of 1900, February 4. I have stated that already.

Then the west Jordan well in which there was never water, but at which the bottom of the well was 1150.1 above sea level, showing that the water level was lower than that point; but how much, I couldn't say.

Q What was the surface elevation there?

A The surface elevation there was 1268.5 above sea level. 1150.1 above sea level was the elevation of the bottom on January 15, 1899.

Q What next?

A The next well is experimental shaft no. 4, which from Mr. Trask's testimony the elevation of the water surface in 90 was 1410.5 feet; the elevation of the surface, 1471.5 feet; 61 feet to water. That was in 1890, according to Mr. Trask.

Q Any subsequent observations than that at any time?

A There is nonetestified to except that Mr. Trask testified that in 1900 he was there and it was dry. The water plane had gone down.

Q And that is all, is it?

A That is all the observations I have. That well is shown on plaintiff exhibit 77 as well L, 99. But that is the same locality, practically. The elevation 1472, which is half a foot higher than the one Mr. Trask gives, and the elevation of water, 1411, which is half a foot higher than Mr. Trask gives, and I see there is an error in the date,-- '99 instead of '90.

The next well is the Stewart well, in which on February 17

nation was made in the early part of 1900. January 6.1 have already one already.

Then the very little well in which Bonny was drier valley, but at which the waters of the so-1 was 1200.1 where the land, showing that the water level was lower than plain; but how then, I wonder? say.

Q. What was the surface elevation then?

A. The surface elevation then at about where the 1200.1 where the level was six elevation of the bottom so forward in, then.

Q. Then water:

A. The water will in equivalent stand/ 9 . 4, so in time so. Level's lowering the elevation of the bottom. Surface by 16 was 1600.1 feet; the elevation of the surface, 1671.3 feet; 31 feet up water. Then was in 1900, according to Q. Then.

Q. Any difference elevation that is by this time?

A. Yes is. Considerable in water back for. Then lowered that in 1900 in was here and in was dry. The water plane was gone then.

Q. And yet is all, is it?

A. That is all the information I know. That will is above in possibly which if we will 6. 80. But now is the new level, practically. The elevation 1671, which is half a two higher than in was dry. Then point, we elevation of water, 1671, which is half a two higher than is. Then point, and I can hardly is 31 water 3 the 1600.- "31 feet/ 4/ "6.

The water will in the former well, in which we [illegible] 17

I believe I observed that--

Q What year?

A 1900. I want to verify that date. Yes, that was February 17, 1900; at which time the water plane was 771 feet above sea level; and on the same date the King well was observed by me--

Q What was the elevation of the surface?

A 1077 feet.

Q Proceed.

A On the same date the King well, the elevation of the water plane was 779 feet and the elevation of the surface 986 feet, February 17, 1900x.

Q Any subsequent observation on either of those.?

A There is not. I never visited those any more. Then the experimental shaft no. 3, on exhibit D, I can only deduce the elevation of water from the Frankish & Stann tunnel, as I have no observation directly on the shaft. But it is so near the tunnel that practically it would be the same as the tunnel. Or, in other words, the elevation of the water plane on this is 1814 feet above sea level, and the surface about 1900 feet above sea level.

Q That is of what date?

A That was of the date when the Frankish & Stann tunnel was constructed. I deduced that from the point at which water was struck in the tunnel, and about the elevation. There is nothing absolutely certain on that estimate. It might vary 10 or 20 feet either way.

The next well is the Saunders well and the 21st Street well of the Lodenhamer series, which when not pumping,

I believe I observed that—

— that you?

A. Yes. I have to notify the dam. Yes, that was from
Friday 17, 1900; at which time the water plane was 771
feet above sea level; and in the meantime the flood will
not exceed 1; were—

— not the elevation of the surface?

A. Left bank.

— Yes.

A. The 5th came down the flood wall, the elevation of the
water plane was 772 feet and the elevation of the surface
the 15th, February 17, 1900.

Q. Do Sunday's observations in either of cases?

A. There is not. I have visited those city dams. The
city superintendent knows me. I, as engineer, I not only
know the elevation of water from the foundation of the
dam, as I have an observation tower on the south.
But if it is so near the tunnel that probably it would
be the same as the tunnel. If, in other words, the eleva-
tion of the water plane is this is like two water
level, and the surface water level was the same.

— That is if was that?

A. That was if the dam when the foundation of the tunnel
was constructed. I endeavor keep the point as much
away as stand as the tunnel, and never in structure.
There is nothing artificial; nothing as has happened. It
might only be in this place.

The water will be the measure well and the dam where
well of the measurement of the, which was approximately

the elevation of the water plane in 1899-- I want to verify that date. I wish to change that date. The date was December 24, 1898, on which the observation was made. Elevation of the water plane 1721 feet above sea level; and the surface, approximately 1825 feet above sea level. That is also approximate, as the surface elevation had to be taken from the topographical map exhibit F, and may vary a few feet.

The 21st Street Bodenhamer well is about the same elevation as the Saunders well. There may be afoot or two difference in the surface, but not enough to amount to anything material. Or, in other words, about 1825 feet above sea level.

Q Were there any observations subsequent to December 24, 1898, on the Saunders well?

A None that I made.

Q None that you know of.?

A None that I know of.

Q Proceed with the 21st Street Bodenhamer well.

A That well is covered by a long series of observations given by Mr. Trask on page 2516 of the record, extending from April 26, 1905, to December 13, 1908.

Q This is the 21st Street Bodenhamer well?

A Mr. Trask gave all of those observations.

Q Now the 22nd Street Bodenhamer well.

A As to the level of water in that well, I have no information except from hearsay; but I was there when the well was being pumped before it was abandoned, and I know there was water in it; but the statement which I have as

The elevation of the [illegible] Dam is 1[illegible]-- I mean to every [illegible] foot to allow [illegible] dam. The [illegible] was [illegible] Saturday Jan. 1[illegible], to [illegible] the [illegible] [illegible]. [illegible] of the water [illegible] was level; and the [illegible], approximately [illegible] above sea level. This is also approximate, as [illegible] differing [illegible] is [illegible] the [illegible] [illegible] 7, and by [illegible] a few feet.

The [illegible] Schuylkill wall is [illegible] the same elevation as the [illegible] wall. There may be [illegible] or [illegible] [illegible] in the [illegible], but [illegible] [illegible] [illegible] [illegible]. [illegible], [illegible] [illegible] [illegible] above sea level.

[illegible] any [illegible] [illegible] [illegible] [illegible], 1[illegible], [illegible] [illegible]?

A. [illegible] [illegible].

Q. [illegible] [illegible] [illegible]?

A. [illegible] [illegible] [illegible].

Q. [illegible] with the [illegible] Schuylkill Wall.

A. This wall is [illegible] by a [illegible] series of [illegible] [illegible]-up [illegible]. [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] 11, 1[illegible].

Q. This is the [illegible] [illegible] [illegible]?

A. No. [illegible] [illegible] [illegible] [illegible].

Q. [illegible] the [illegible] [illegible] wall.

A. [illegible] the [illegible] [illegible] [illegible] wall. I [illegible] [illegible] [illegible] [illegible] [illegible]; for I [illegible] [illegible] the wall was [illegible] [illegible] [illegible] [illegible], and I [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

to the level of the water when it was sunk is from Mr. Bodenhamer by hearsay, and I don't think it would be competent here.

Q All you know is that the water was being pumped from it at a certain date. What was the date?

A December 24, 1898.

Q No observation since that?

A No. The well is now abandoned, having been filled up some years.

Q That completes the hydrology of those several wells, does it?

A I believe it does, except the westerly Sourwine shaft, of which I have one measurement of depth, and it was dry. Do you wish that?

Q Yes. That is the one--

A That is the one on the west of the colony lands and marked Sourwine shaft between station 2 and station 1 of the Cucamonga Rancho, and which is also east of the mouth of the Bodenhamer tunnel about a distance of 700 or 750 feet, according to the manner in which the shaft and the tunnel are depicted on defendants exhibit D.

Q What were your observations of that and the water in it?

A That was on the 19th of September, 1907, that Mr. Trask and I were there together, and this Sourwine shaft was then 164 feet deep and dry, and had caved in in the bottom. It bore the appearance of having been much deeper at one time.

Q That was plainly discernable from the top?

A Yes; that was plainly discernable from the top. If you have a mirror to throw the light into it you can see the bottom as plainly--

Q Could you see how much deeper it had been before the cave, with your mirror?

A No, you can't do that; you can only see down to the cave.

Q That is what I supposed; and that is why I can't understand how it showed that it was much deeper.

A The caves were visible; but of course, you couldn't determine that it had been a certain number of feet deeper. You could see the caves andthe sides being irregular and the loose material on the bottom.

Q Is that the only observation you have on that shaft?

A It is.

Q Now, Mr. Finkle, allow me to direct your attention to the Reporters transcript at page 88, the table of water elevations in the 16th Street wells furnished by Mr. Trask and before the beginning of the pumping of that season, as shown in the table at page 82. That is to say, the date April 11, 1904. I will ask you to give me the elevations of the water in the San Antonio Water Company's well no. 6 and that of the Haskell well no. 7--

A I can't give you that because no. 6 is not included in the table.

Q That is right. Come down to May 12, where it is given--May 12, 1904.

A What do you wish on that date?

Q The elevation of the water in those two wells.

Q. Keep look one slightly downwards from the top. If you have a number to place the light into it you can use the buttons to adjust.--

Q. Would you use the same lenses as last week later on, with your mirror?

A. No, you can't do that; you can only use one in the mirror.

Q. That is what I wondered; but this is why I don't understand how it moved that it was same image.

A. The same was shining but of course, you realize, because that it had into a certain number of feet away. Its really not the same making sides being irregular and the lines deviating as the bulge.

Q. Is that the only observation you have on that model?

A. It is.

Q. Now, Mr. Fiske, allow me to direct your attention to the Thursday Incorrect/ at page 20, the lower of which situation is the same mirror which Foucault by Mr. Trow and before the beginning of the reading of that account, as shown in the table at page 20. Will it be so, the 8th April 19, 1906. I will ask you to look at the illustration of the model in the 8th Lecture that of Foucault's with an. A and line of the Sketch will be. T--

A. I call this you that because so. I do not believed be the model.

Q. That is right. Same date of the 20, there is a question 19, 1906.

A. That is I am not on the Sheet.

Q. The illustration of the mirror is shown the model.

A No. 6 and no. 7?

Q Yes, sir.

A No. 6 is given as 1347 feet above sea level; and no. 7 is given as 1347.4 feet.

Q A difference of .4 of a foot?

A Yes; no. 7 is .4 of a foot higher than no. 6.

Q They show a pretty close correspondence in elevation?

A Showing a slight fall to the west.

Q Very close correspondence?

A Very nearly; .4 fall.

Q On May 19 it appears from page 82 that no. 8 Haskell well began pumping.

A It does.

Q And on that date will you state, if you please, the elevations of the three wells, the two Haskell wells and the well no. 6?

A Well no. 6 was 1347.1 feet. That is well no. 6. Well no. 7 was 1347. feet and well no. 8 was 1347.4 feet.

Q That is to say, that at that time the well no. 6-- on May 19-- was .1 of a foot higher than well no. 7 and .3 of a foot lower than well no. 8?

Mr. McKinley: This seems to be the same class of testimony which Judge Britt objected to , and it is repetition; and I object to it as not proper cross examination.

Mr. Britt: I propose to found a question on it.

Mr. McKinley. The question can be founded without going over the figures.

Mr. Britt: It is merely preliminary.

The Court. The objection is overruled. A That is true.

A. Ok, I understand. Q?

Q. Fine, sir.

A. Ok. I'm looking at Line 7 here where you stated; and on, I'm going to Line 9.

Q. My difference of .8 of a cent.

A. Yes; so, I'm -- I'm -- I'm sorry -- I'm in error.

Q. Okay when a purchase price per gallon -- we'll be alright.

A. Gasoline's which fell in the ground.

Q. Very close approximation.

A. Approximately; .8 [sic].

Q. So, the 18-31 equivalent line would be what on, Mr. Bowen; with Bowen pipeline.

A. It here.

Q. And so that data will you take, if you please, the direction of the Grove Metis, the two Bowen Metis and the well on. Q.

A. Well no. I see 1240.1 here. That is only on. I. Well on. I was 1247. Then and well on. I was 1240.4 here.

Q. That is in my. Well so let's take the well on. Ex-ept 18-- was .1 of a cent higher than well on. I and .3 of a cent lower than well on. Q.

A. Correct; this among is by the very nature of testimony which being first original M , but is at variance; but I believe is it so not greater than reasonable.

Q. Well: I prefer to find a question in it.

A. Sorry. The question was in Number eleven using the 11.

Q. Sorry; I'm in Number 1 [sic] [illegible].

The Court. The attitude is material. A that is true.

Q Now, the well number 6 is the nearer to the Haskell wells 7 and 8 than any other of the 16th street string?

A Well, I don't know what you mean by the 16th street string.

Q Commencing from 1 and running up to 8.

A Well, if you mean that you are right.

Q That is as we have usually referred to them here; that shows a pretty close correspondence doesn't it, an extremely close correspondence of the water levels in those wells at that time?

A It shows on that date there was a little difference in the water level of the three wells.

Q And the well number 8 beginning pumping on that date, May 19, it appears from the tabulation, page 89, that no elevation was taken of it during the remainder -well it was sometime afterwards apparently, during the remainder of that season, the year of 1904. Now, then number 8 being pumped and number 8 not pumped, I call your attention to the next date, which was May 26th, and the well number 6 had fallen to 1346.2?

A Had fallen to 1346.2; yes.

Q And the well number 7 had fallen to 1343.8?

A That is true.

Q Nowhave you pursued those two columns, showing the elevations of the well number 7, and the well number 6, thenceforward during that season, to observe whether or not they maintained a close correspondence?

A I can't say that I have done so, Mr Britt; I have not paid any attention to well number 6, as it has been filled up

Q. Then, then well number 4 be the number in the Swedish well? Pause then you refer of the Saint Pierre Swedish.

A. Well, I don't know which you come up the long square the.

Q. Commencing from I am reading my 14 6.

A. Well, if you know that you are right.

Q. That is to be an Swedish relating to long been; that where a pretty close correspondence exists? If, an extreme by close correspondence of the water levels in these wells at that time?

A. It seems as that quite there was a little difference in the water level of the three wells.

Q. And the well number 6 beginning reading on that date, May 12, it appears from the Swedish, page 89, that no elevation was taken of it during the summer -will it not positive affirmative expectedly, during the remainder of that season, the year of 1906. Now, then number 6 being pumped and number 4 not pumped, I call your attention to the work table, which was May 31st, and the well number 6 had fallen to 1966.27

A. Has falling to 1966.7; yes.

Q. And the well number 7 has fallen to 2067.87

A. That is true.

Q. Between you pumped these two wells, showing the elevations of the well number 7, and the well number 6, between Saturday during that season, do observe whether or not they maintained a close correspondence?

A. I don't say that I have done so, I think; I have not made any attention to well number 6, as it has been filled up

since my connection with this matter, and not been pumped. I think I can truthfully say that I have never given any attention to the comparison of that well with any other well.

Q That is the reason I am calling your attention to it, was because it was not pumped, the next one of the 18th street w wells, next west of the Haskell wells, and I desire to have your attention focussed on that circumstance that that well was not pumped.

A Well number 5 was not pumped until July 15.

Q That is a different proposition; I want to know whether or not those columns show a close correspondence between the elevation of the Haskell well which was pumped, the Haskell well being pumped, and the number 5 not being pumped?

Mr Surr: Objected to on the ground that the columns speak for themselves.

A If you wait till I figure that out I can do it; it will take half an hour to do it; I can bring it in in the morning if you wish it; I have not figured that out.

Q You can't make the inspection here and determine?

A It would be impossible, with the multiplicity of figures of this kind to determine the relation, without subtracting each elevation from the one preceding.

The Court: There was an objection made a moment ago by Mr Surr: what was that addressed to?

Mr Surr: That was as to what the columns show; the columns speak for themselves as to what they show.

The Court: The objection will be sustained.

Mr Britt: Exception.

Q Proceeding from that proposition, you ventured some

dance by immediately with this author, and not been guided.

I.Hobbs I can honestly say that I have never given any attention to the comparison of Lucknow with any other well.

Q. That is the reason I am asking you attention to it, was Lucknow drawn for glamour, the best one of the Indo Aryan v well, most part of the Muslim world, but I mainly in some pre-existing Indian architectural structures that that well was not created.

Q. Well number one was our young small Molly Ib.

A. This is a different proposition; I mean in some sources or not, there seems quite a close correspondence between the elements of the Muslim well with my people, the Indian well being round, and the number a sub being square.

Sir Thor: Hybrids in the world but an entire epoch in Lucknow.

A. If you will bear (Figure 1) in mind, it will help better than to do it; I do not, it is the Hindu it was also it; I have not figures that.

Q. Was Mr. made his Lucknow more and interesting?

A. In Muslim Imperialis, with the multiplicity of figures of this kind is characteristic was relative, without contradicting such elements from the pre-Muslim.

Sir Thor: Shall we be minutes take a second one by Sir Thor: Shall we take Lucknow Ma?

Sir Thor: That was to be all the Hindus elsewhere the Islamic epoch for Lucknow is do not the prime.

Sir Thor: The meeting will be adjourned.

Sir Thor: Everyone.

A.Interpreting from that proposition, you studied some

strictures on the subject of correspondence between the elevations in the Haskell well number 7, and the well called Hellman well number 2, or well S on Mr Frask's tabulations, at the head of the west branch of the Y tunnel: May I ask you to scale the distance between the Haskell well number 7 and the Hellman well number 2 at the head of the west branch of the Y tunnel?

A By Haskell well number 7, I suppose you mean the well numbered 7 in this case, the Haskell well number 1?

Mr Pritt: We speak of the two Haskell wells and we are constantly grouping them as Haskell wells; I refer to the well number 7, Haskell well number 1.

A There is a Haskell well number 1 and a Haskell well number 2; Haskell well number 1 being the same as well number 7.

Q Well, that is the one I refer to.

A That scales in a straight line 1200 feet.

Q What is the distance from the same well, Haskell well, number 7, west to the Rubio well, or the well number 6 of the San Antonio Water Company?

A That scales 1500 feet; both of those are given from defendant's Exhibit E.

Q I will ask your attention to the table at pages 88 and 89, under date of May 12, 1904, the date when the Haskell well began pumping, the difference in elevation between the well number 7, and the Hellman well number 2 was then 2.3 feet wasn't it?

A Those are the figures I gave the other day in my testimony; I think that is correct.

Definitely no the origin of correspondence. Taking the
diagonal on the Kendall-Wilcoxon 7, and the well well a
unknown well number 6, so that 3 on or Frank's hospitality,
at the head of the very Prince of the 7 summit. Say I ask
you to make the diagram between the nearly well number 7
and the Kellner well number 2 at the head of the west Prince
of the 7 summit?

A. By Kendall v.11 number 7, I assume you mean the well
numbered 7 in this case, the medical work number 11.

Q. Tell me again of the Ben Kendall walks and on one
crossingly grouping then on Kendall only; I prefer to the
well number 7, Monday well number 1.

A. There is a Kendall well number 1 and a Kendall well
number 2; Kendall well number 1 being the same as well
number 7.

Q. Well, that is the one I prefer to.

A. That means in a straight line 1500 feet.

Q. What is the distance from the moon well, Kendall well,
number 7, with to the Jones well, or the well number 6 at
the Sir Alberic Tabor Camp-?

A. That means 1000 feet; both of Jones are given from
Rutherford's Kendall 2.

Q. I will ask you attention to the making of pegs on and
off, water gate at day 12, 1968. The line from the Kendall
well Degree grouping, the difference in elevation between the
well number 7, and the Kellner well number 2 was then
5.3 feet, wasn't it?

A. These are the figures I gave the Brian day in my tes-
timony; I believe that is correct.

Q You have it before you?

A I have that here.

Q Pretty middling close for the waterplane in wells that distance apart, wasn't it?

A Well, I don't know what you mean by that; that would depend on so many conditions that that would be hard to say, whether it was middling close or middling distant.

Q What was that date last stated?

A May 12, 1904.

Q That was not the date when it began pumping?

A That was ~~the~~ date prior to when it began pumping.

Q It began pumping on May 19: on May 19 the well number 7 was 1347 feet, and the Hellman well number 2 was 1345.2?

A Yes, sir.

Q A difference in elevation of how much?

A Of 1.8 feet.

Q Then on May 26, a week later, the difference was .2 of a foot, wasn't it?

A Yes, sir.

Q The Haskell well had declined to 1343.8, and the Y tunnel to 1346.6?

A I think you are wrong about that; 1343.6 is what it is

Q well, I said 1346.6 ; that was an error; On June 2, 1904, a week later still, the Haskell well had declined to 1343.3 and the Y tunnel well to 1343.2?

A Yes, sir.

Q They stood then with a difference of .1 of a foot?

A Yes; Haskell well being .1 of a foot higher than Hellman well number 2.

Q: Can Sam do it before June?

A: I have also done.

Q: Thirty additional class for interpolation on units

based relative speed, wouldn't it?

A: Well, I don't know what you mean by that; this would

depend on the conditions that a lab would be used in,

whether it was building other or existing fabrics.

Q: Which was first interior/exterior?

A: Only in, Linda.

Q: Then was not the Lucie-Smith, Ilkeston geology

A: That was designed prior to when it began growing.

Q: In terms planning on July 19: on July 19 the soil moisture

I was 1047 feet, and the Ilkeston soil moisture I was 1050.

A: Yes, sir.

Q: A difference in elevation of ten meters

A: Of 1.8 feet.

Q: Then on July 26, a week later, the difference was .2

of a foot, wasn't it?

A: Yes, sir.

Q: The Ilkeston soil had dropped to 1060.8, and the 7

tension to 1060.6?

A: I think you are wrong about that; 1060.8 is what it is

Q: Well, I said 1060.8 ; that was in error; the other 6,

1060, a week later still, the Ilkeston soil moisture is

1060.8 and the 7 tension soil is 1063.97 .

A: Yes, sir.

Q: They would take with a difference of .1 of a foot?

A: The; Ilkeston soil being .2 of a foot higher than Ilkeston

soil moisture ?.

Q A week later still, June 11, the Haskell well was 1342.1. and the Hellman well 1342.2: Both declined hadn't they?

A Both declined, but they were not in the same relation as they were on the 2nd of June.

Q Well, what was the difference in elevation at that time: .1 of a foot wasn't it?

A No, .2;on the 2nd of June the Haskell well was .1 higher than Hellman well number 2; and on the 11th of June it was just the reverse and the Haskell well was .1 of a foot lower than the Hellmanwell number 2.

Q Wasn't there a difference of .1 of a foot in absolute elevation on the 11th of June?

A I don't figure it that way; you have a plus quantity in one instance and a minus in another, and that makes .2

Q Suppose yu look at that and see i there is not a difference of only .1 of a foot in the elevations of the two wells referred to.

A I was not talking about that; I was talking about the variation between the two dates; they stood .1 of a foot apart each time, but in the opposite direction.

Q Didn't they stand mighty close together?

A They did stand mighty close together.

Q And on June 18, how were they? 1341.8 in the Haskell well, and 1341.8 in the Y tunnel well?

A Yes, sir; they then had attained exactly the same elevation or level; for the first time they stood on the same level on that date.

Q I see you are commenting upon that circumstance: Would you

Q. A week later until, June 12, the Russell mail was 1947.1. and the Fulham mail 1947.2: Does anything happen then?

A. Both matches, but they don't end in the same results as they have on the 2nd of June.

Q. Well, what was the difference in classification that time: 1-0 a draw's 1?

A. No, 2; the 2nd of June the Bailey's mail was 1 higher than Dalton mail number 2; and in the 12th of June it was just the reverse and the Russell mail was 2 and the Jerry the 1 the Bellamy mail number 2.

Q. Then's there a difference of 2 of a high-to-low-to-low classing in the 12th of June?

A. I don't figure it that way; you have a plus quality in-the instance and a minus in another, and that makes 2.

Q. Suppose you said in that and we believe it was a difference of only 1 of a high to the classification of the two mails referred to.

A. I was not talking about that; I was talking about the relation between the two dates; they stood 1 of 2 left short with them, but in the opposite direction.

Q. Didn't they stand slightly close together?

A. They did stand slightly close together.

Q. And on June 12, the Bere-Jerry 1947.2 in the Bailey mail, the 2947.1 in the Fulham mail?

A. Yes, sir; they have had relations nearly the same-time or first; for the first time they stood in the same level on that date.

Q. I see you are somewhat-- some-thing circumstances: Tell me

expect two wells, one of which is being pumped, and ofcourse the quantity of pumped water varied from day to day as is shown by the measurements, would you expect them to keep exactly the same level, 1200 feet apart?

A No, I wouldn't; particularly when I see they didn't do it before the pumping commenced; I see they changed .5 in one week before the pumping commenced; the first two measurements you read show that.

Q June 27 is the next?

A The next is June 18.

Q No, I have just called your attention to June 18.

A Yes, June 27, is the next one you have not mentioned.

Q On June 27, the Haskell well had declined to 1341.1, or .7 of a foot, hadn't it?

A It had.

Q And the Hellman well had declined to 1341.2 or .6 of a foot?

A That is correct.

Q Pretty close correspondence isn't it?

A Happened to be between those two dates.

Q On July 2, the Haskell well had dropped to 1340.7, or .4 of a foot had it not?

A It had.

Q And the Hellman well or Y tunnel well had dropped to 1340.9, or .3 of a foot?

A That is correct.

Q Pretty close correspondence isn't it?

A It was not quite as close as on the previous date, but it is fairly close.

Q Isn't it remarkably close?

Q Isn't it remarkably close?

A I think it is, considerin that the Cucamonga Water Company was also pumping in the Lone Star tunnel on the same date; various influences at work.

Q How do you know that? Didn't you say you didn't know what the Lone Star tunnel was doing? Didn't you say that?

A I say that when I was there at various times, I saw it pumping during the irrigation season, but could not measure the water, because their weir was locked.

Q Do you know what it was pumping on July 2, 1904?

A You can't prove that by me; I know they pumped during the entire irrigation season practically every year; and the best evidence of that would be the records of the Cucamonga Water Company, which you can easily obtain if you wish them.

Q Why didn't you obtain it?

A It is not in my power to obtain them; I am not connected with the Cucamonga Water Company, like your clients.

Q You don't know whether it was pumping or not do you?

A Simply by deduction; simply that they were pumping during the irrigating seasons while I was there, and from that I deduce the fact that they needed the water and pumped those wells.

Q You have not seen any such close correspondence in elevations of water, between the Cucamonga Water Company's wells, as that between the Haskell well, and the Y tunnel well have you?

A Yes, indeed, I have seen a closer correspondence, on Exhibit O in this case, between the identical flow from

Q. Smith is unmarried, isn't

A. I think so, yes, considering that the Gunnerage Sales Company was also employed in the time-saver business on his behalf, reviews information as well.

Q. Now on you know, Smith, didn't you say you didn't know the time saver tested was on duty - didn't you say that?

A. I say that when I was there at Morlaine Manor, I was planning on the investigation means, but would not have the daily, because this was later.

Q. On you have said it was yesterday on July 6, 1941?

A. The car's green this-by-car; I have been employed during the entire investigation, assume practically every year; and the best evidence of that would be the records of the Gunnerage Sales Company, which you can modify inform if you wish them.

Q. Why didn't you subpoena it?

A. It is not in my power to obtain them; I am not connected with the Gunnerage Sales Company, like your client.

Q. The car's time whether it was yesterday or not is just simply by deduction; simply that they, were putting fuel for the Morlaine mansion while I was there, but that Gunnerage the fuel tank that they needed the water and engine times only.

Q. You have not been any such state interrogatories in either either or other, between the Gunnerage Sales Company's until, in that between the Smith's well, and the I Hamed well here-yet?

A. Yes, indeed, I have been a-first-rate interrogatories, in Smith's in this case, between the Hamed Car Line

this Hellman well number 2, and the Cucamonga well number 9, (9), when there was no other influence operating to affect it, excepting the Cucamonga Water Company's pumping.

Q Do you mean that they kept along within .1 of a foot of each other?

A No; I mean this -.-

Q Or a few tenths of a feet?

A I mean when the Lone Star tunnel well began pumping in 1918. the San Antonio Water Company had not been pumping, and yet immediately thereafter the discharge from Hellman well number 2 and the Y tunnel began to drop, and continued to drop just the same - - and the San Antonio Water Company had nothing to do with it; whereas on this table on page 89, the drop in Hellman well number 2 had already occurred before the 19th of May.

Q No, it hadn't.

A Yes, it had; this table shows it.

Q How much?

A It had ~~dropped~~ dropped .5 of a foot in one week.

Q It kept right along with the pumped well though?

A I don't see that it did; I don't think that you can found any sort of a theory on this.

Q I am not founding any theory; I am merely asking you about facts.

A I am telling you about the facts, that this shows, that it shows that this well started to drop, before the San Antonio Water Company commenced to pump. If you wish more facts on that score I will refer you to Exhibit 3, and compare

Data Systems will number 2, and the Computer will number 3. (Q1), when there was no other information available to clients 1b, supplying the Computer Inter-Company payroll.

Q. Do you come back into play along with 1 of 2 Inter-Company?

A. No; I resigned --

Q. Or a few months at a time?

A. I was when the Inter Inter-Co. Will Dept. joining in 1970, the Data Systems Sales department and Inter-Co. Pay. Dept. Immediately commences the attempts from Daisies will number 2 and the 3 Dept. begins to carry, and eventually it drop just the week -- and the Data Systems Sales department to do 1b; observe on this table on page 15, the drop in Daisies will cause 2 and already occurred before the 1970 of map.

Q. Ok, 1b month?

A. Yes, 1b. Yes; this table shows 1b.

Q. Okay month.

A. It has [illegible] 3 of a 2 to 1 in one month.

Q. It's right along with the proposed Daisy Concept?

A. I think we have it; I don't know exactly you may have may work of a history on this.

Q. I am not familiar with history; I am merely asking you which is.

A. I am Building you about the Study, that this shows, but it shows that this will start in Dec. before the Dec. Inter-Inter Company measurement is done. If you look back Data on this sheet I will refer you to Column 3, and review

it with some other data on page 93 of the transcript, showing the same thing that this table shows; the drop in Hellman well number 2 started before the San Antonio Water Company began pumping the well number 8, and therefore if the drop were due to the San Antonio Water Company's pumping, it evidently anticipated the action of the pumping, by dropping before the pumping started.

Q Does that at all cut any figure against the proposition thatthere is a sympathy between those wells?

A I should think it would cut a figure, if onxe well begins to drop, before there is any interference at the one with which you are trying to prove sympathy. If you refer to 1905, the same circumstance occurs, before the beginning of pumping.

Q Wait a moment; you are not asked to deliver a lecture at every point the opportunity appears.

A I suppose I have a right to answer the question.

Q Let me inquire of you whether the San Antonio well number 7 did not drop .6 of a foot before it began pumping in May, 1904?

A From what date?

Q From May 7 to May 19, before it began pumping?

A I see it did; wells usually drop some in the summer, when the dry weather comes on.

Q Might not the Hellman well have dropped for that same reason?

A It might; but it dropped .5 in half the time; it dropped more than the San Antonio Water Company well; it dropped almost as much in one week as the San Antonio Water Company

it with some other data on page 17 of the transcript, showing the same thing that this table shows; the drop in [illegible] well number 6 started before the San Antonio Water Company began pumping its well number 5, and therefore if the drop were due to the San Antonio Water Company's pumping, it evidently anticipated the action of the pumping, by dropping before the pumping started.

Q Does that at all cut any figure against the proposition that there is a sympathy between those wells?

A I should think it would cut a figure, if some well begins to drop, before there is any interference in the one with which you are trying to prove sympathy. If you refer to 1938, the same circumstance occurs, before the beginning of pumping.

Q Wait a moment; you are not asked to deliver a lecture at every point the opportunity appears.

A I supposed I had a right to answer the question.

Q Let me inquire of you whether the [illegible] well number 6 will not drop .3 of a foot before it began pumping in say, 1936?

A From what date?

Q From day 7 to day 17, before it began pumping?

A I see it will; wells usually drop down to the present, when the dry weather comes on.

Q Suppose the [illegible] well had dropped for that same reason?

A It might; but it dropped .3 in half the time; it dropped more than the San Antonio Water Company well; it dropped al-

[illegible]

well did in two, before pumping commenced.

Q There is no measurement on May 7 is there?

A There is a measurement of the Hellman well number 2 on May 7th.

Q Look again; on May 7?

A There is none on May 7; one on May 12; I am speaking of the change in the relation of those two wells between May 12 and May 19, and you went back to the 7th; I didn't.

Q Between May 12 and 19?

A Between May 12 and 19.

Q You said that the Hellman well began to drop, before the Haskell well began to pump?

A I didn't say that.

(Portion of previous testimony of witness read by reporter)

A If you permit me to refer to exhibit 3, I will show the figures to corroborate that.

Q Look at these figures a moment; look at the measurement of the Hellman well number 2, or the Y tunnel well on April 28: 1344.9 wasn't it?

A It was.

Q And on May 7, there wasn't any measurement?

A No measurement.

Q And on May 12, it was 1345.1 and it had raised hadn't it?

A From April 28 to May 12, yes, sir.

Q And on May 19, when the Haskell well began to pump, it was 1345.2?

A Yes, sir.

Q It had raised instead of dropping, up to the time the

Q: Yes, I am. Being [illegible] [illegible].

Q: There is no measurement on day 7 in degree?

A: There is a measurement of the [illegible] will [illegible] [illegible] day 7?

I have [illegible] on day 7?

A: There is [illegible] on day 7; [illegible] on day 12; I am [illegible] of the change in the relation of those two [illegible] between day 12 and day 14, and you [illegible] on the 7th; I don't.

Q: Between day 12 and 14?

A: Between day 12 and 14.

Q: The only [illegible] the [illegible] will begin to [illegible], unless the [illegible] will begin to [illegible].

A: I didn't [illegible].

Q: Looking at previous [illegible] of [illegible] read by [illegible]?

A: If you permit me to refer to exhibit 3, I will [illegible] [illegible] to [illegible].

Q: That is [illegible]. Figure a [illegible]: Isn't it the [illegible] of the [illegible] [illegible] [illegible], by the 7 [illegible] [illegible] on day 7?

A: [illegible] [illegible]?

A: 21 [illegible].

Q: [illegible] on day 7, [illegible] [illegible]?

A: No [illegible].

Q: And on day 12, it was [illegible] and it [illegible] [illegible]?

A: [illegible] on day 12, yes, sir.

Q: And on day 13, when the [illegible] will begin to [illegible], it was [illegible]?

A: Yes, sir.

Q: It had [illegible] [illegible] of [illegible], as in the line the

Haskell well began to pump?

A That well had raised, but as to the relation between that and well number 7, I wish to explain what I meant by the drop of .5 of a foot.

Q Just wait a moment; you can explain that in a minute. Now, on the 19th of May, the Haskell well began to pump, and the Hellman well number 2 flow had fallen at the next measurement hadn't it?

Mr McKinley: Objected to as not proper cross examination. The measurements speak for themselves.

The Court: Objection sustained.

Mr Britt: Exception.

A I would like to explain.

Mr McKinley: Wait a minute; there is no question.

A Well, in regard to the former matter of .5 of a foot.

Mr McKinley: Well, I will ask you that in redirect.

Q You mentioned that the supposed dike of the Red Hills crops at the Sycamore tunnel, I think you called it the Sycamore tunnel: Where is this Sycamore tunnel?

A It is west of the Ontario Colony, and near the wash of the San Antonio Canyon; I don't know as it is shown on any of the maps here; they are not extensive enough; possibly one of the Government maps might be large enough to take in that territory.

Q How far distant from the elevation which you have called here the Red Hill?

A Something like two or three miles or three or four miles; it might be four miles; I have never measured it; I would have to take a map to ascertain.

Q. You speak of the Sycamore tunnel there, is that the property of the San Antonio Water Company?

A. It is not.

Q. Is it a water tunnel or tunnel for the passage of some railroad, or other highway?

A. It is a water tunnel in which the Upland Water Company has an interest, and also other people, who have land west of the Ontario Colony; I believe it is called the Sycamore Water Company, the company owning the tunnel; it is a tunnel developing water from the ancient alluvium at that point.

Q. You spoke about the different washes of the Cucamonga Creek or Canyon, that it forks some distance below the mouth of the mountain canyon; I inquire of you whether the wash which carries the most of the flood water of that stream does not pass to the east of the red hill, down through the Cucamonga Springs?

The Court: You speak of the flood water; I suppose you mean the surface runoff?

Mr. Brill: Yes, that is what I was speaking of.

A. I don't think that statement is a correct statement; I think there are times when that does carry most flood water, and I have seen many times when the other washes carried by far the greater proportion; it is a variable wash.

Q. Isn't that the main wash.

A. I don't think it is the main wash at all times; it is a variable quantity; I have known it for 30 years, and sometimes I found more water in the wash to the east than in the other washes, to the west, and sometimes it was the other way.

Q. Are some of the [illegible] tunnel there, is that the property of the [illegible] company?

A. It is not.

Q. Is it a water tunnel or tunnel for the passage of some railroad, or other highway?

A. It is a water tunnel in which the [illegible] Company has an interest, and also other tunnels, [illegible] of the [illegible]; I believe it is called the [illegible], [illegible]; it is a tunnel [illegible] water from the [illegible] at that point.

Q. You spoke about the difference [illegible], [illegible] across the [illegible] of the [illegible]. I suppose if you [illegible] the [illegible] of the [illegible], that [illegible] in the [illegible], [illegible] the [illegible].

Mr. [illegible]: [illegible]; I [illegible] [illegible]?

Mr. [illegible]: Yes, that is what I was speaking of.

A. I don't think that statement is a correct statement; I think there are times when [illegible] water, and I have [illegible] times when the [illegible], for the greater [illegible]; it is a variable thing.

Q. [illegible] the [illegible].

A. I don't think it is [illegible]; it is a variable quantity; I can [illegible], [illegible]-times I [illegible] in the [illegible] in the [illegible], in the [illegible], and [illegible] the other way.

Q Isn't it generally the main wash?

A I don't think it is generally; the west side has so many washes, that after the water goes to the west side it divides into five or six channels; for that reason the east chamel appears to be larger than the channel on the west side; because on the east side you have all the water concentrated in one narrow channel, whereas on the west side you have it divided into so many.

Q Isn't that east wash the principal wash of the lot?

A If you compare it with any one single wash on the west side I agree with you that it is larger than any single wash on the west side; but if you take the aggregate of the west washes the reverse is true, if you take all of them.

Q Doesn't it carry the most of the storm water out of the Cucamonga Canyon, that east wash?

A I think not. At the present time I think not. The question was in the present tense.

Q You testified in the trial of a case here in this Court, entitled Macpherson, and others, against the Cucamonga Fruit Land Company and others, didn't you?

A I did.

Q In the year 1900?

A I did.

Q Being there employed as a witness by the same San Antonio Water Company that has employed you in this case?

A I was employed by the San Antonio Water Company as its engineer at that time, and I was called by them to testify if that is what you mean.

Q At page 1051 of that testimony, I inquire of you whether

you were interrogated and gave reply as follows: You have it before you?

A I have it.

Q "Q Now, returning to the matter that you were testifying about, as to the country below the Cucamonga Mountains, where do you say that the principal washes of that stream are, that is of the storm flow, with reference to the Red Hills?

"A The principal wash of all is the wash indicated on this exhibit 12, as running through the east Cucamonga and marked 'wash'. Then the next in importance was the most westerly shown on the same exhibit with bridge at the foot of it; the third in importance is the wash shown intermediate between the two, and also marked 'wash'; the fourth in importance is a wash not shown here, because it is not a continuous wash, only to Base Line, and comes down between the two eastern washes, and in fact all of the country is very largely washed over at the extreme upper end of this map; but it comes down and terminates about 1000 feet, or a little over 1000 feet from the bluff of the Red Hill; it does not terminate there, but it runs on down in a southerly direction, and begins to spread out more or less, and the remains of that wash find their way as an outlet, close to the end of tunnel number 2, which is marked Cucamonga Vineyard Fruitland Company's tunnel, on this map, where there is a bridge across there; that I would classify as the fourth wash in importance.

"Q What distance is the principal wash west of the Stowell wells?

"A Well, it was copied I believe on this map from the

you were interrupted and you reply as follows: "Do
have it before you?
A. I have it.

Q. "Is the, indicated in the matter that you were testify-
ing about, in the district from the Dominion Constitution,
where is you say that the political works of that nation
are, that is, where close, with reference to the military
"A. The principal work of all is one most important of Gali-
Dublin 22, on reading through the text without any method
"Q. Is the work in question was the main work-
where in the same exhibit with bridge at the foot of Gal-
the point in question is the main work towards
the two, and also mention "work"; the (work) in ques-
position is a work not known here, because it is not a com-
plete work, only a dead line, and there are two
two workers works, and in fact all of the country is very
largely ruined over in the extreme upper end of this map;
but it seems some not particular work 1000 feet, or a lit-
tle over 1000 feet from the-start of the 2nd Gill; it does
not particular there, but if you go down to a smaller
direction, and begin in general area or here, you be
reading at least with the right way in the middle, then as
the end of general number 2, which is called Dominion Pro-
perty Company's Canal, in this map, where there is a bridge
across there; that I will identify as the fourth work
in importance.

Q. What direction is the principal work we-the Edward
work?

A. Well, if you begin 7 miles in this map from the

Government surveys, and taking that as correct, it would be between three and ~~xxxxxxxxxxxxxxxx~~ four thousand feet west of the Stowell well .

"Q The principal wash east how far is that from the Stowell wells?

"A Nearly half a mile. "

Did you give that testimony on that occasion?

A I did.

Again I call your attention - -

A Now, in regard to the testimony just read - -

Q Wait a moment; I would like to ask your attention to page 1096 and 1097, of that volume, line 29, and inquire of you if you were interrogated and gave testimony as follows:

"Q You speak of the wash on the east side of the cienegas being the principal wash -"

I will commence at line 11:

"Q Now, Mr Finkle, resuming where we were this morning, I think we were upon the washes,- I will ask you, supposing that a surface wash would indicate in any way the course of any subterranean streams under them, where would the subterranean streams run with reference to the Stowell wells?

"A There would be one subterranean stream running to the east by the winery; that would be the largest in size."

Did you so testify?

A I did.

Q Then did you further testify:

"Q You speak of the wash on the east side of the cienegas as being the principal wash: Why do you so term it? "

A Where are you reading now? Did you skip some there?

Government surveys, and taking them as correct, it would be between three and three-quarters [illegible] that west of the Russell mill .

"Q. The principal wash west how far is that from the Russell mill?

"A. Nearly half a mile."

Q. Did you give that testimony on that occasion?

A. I did.

Q. Again I call your attention - -

A. Now, in regard to the testimony just read - -

Q. Wait a moment; I would like to call your attention to page 1000 and 1007, of that volume, line 13, and inquire of you if you were interrogated and gave testimony as follows:

"Q. The mouth of the wash on the east side of the channel - being the principal wash -"

I will commence at line 11:

"Q. Now, Mr. Clark, assuming where we were this morning, I think we were upon the measure,-- I will ask you, supposing that a certain fact would indicate in any way the course of any underground streams under there, where would the underground streams run with reference to the Russell mill?

"A. There would be two underground streams running in the wash by the mill; that would be the largest in size."

Q. Did you so testify?

A. I did.

Q. Then did you further testify:

"Q. The mouth of the wash on the east side of the channel as being the principal wash: why do you so take it?"

A. Where are you reading now? Did you skip some lines?

Q Yes I did; from line 19 to line 28.

A You left out part of my answer?

Q Yes, from the former question.

"Q Why do you speak of the wash on the east side cienega as being the principal wash? Why do you so term it?

"A Because it carries at this time and ever since I have known it, most of the storm water passing away from Cucamonga Canyon."

Did you so testify?

A That is a part of what I testified to in those answers and questions. I want to say in explanation, that this is exactly consistent, if all of it is read, with what I testified in this case.

Mr Britt: I ask that that statement of the witness be stricken out, because it is not for him to determine whether it is consistent or not.

The Court: That will be stricken out.

Q I ask your attention to page 1114 of the transcript.

A I have the page.

Q You gave testimony concerning the same red hill in that case that we have had in controversy here, or that has been involved in this controversy?

A I did in a great many places in the transcript.

Q I inquire of you if you were asked in that case, about the banks of a supposed underground stream, in the vicinity of the Red Hill?

A I was asked about that in that case; yes.

Q On that subject were you interrogated and did you give response as follows:

"Q Now, then, is there any western bank in your opinion, to any underground stream, as testified to by any of the witnesses for plaintiff?

"A I have not been able to find any indication of any bank.

"Q In your opinion is there one?

"A In my opinion there is none.

"Q In your opinion is there any eastern bank to any underground stream, as testified to by any of the witnesses for the plaintiff?

"A I think I have already stated that in my opinion there is no bank; that this Red Hill is a capping, or local surface formation, as demonstrated by the borings through it. "

Did you so testify?

A I so testified, and in answering the last question I referred to what I had already stated at pages 1100 and 1104 of this same transcript; I then referred to statements on pages 1100 and 1104 of the same transcript

Q Have you learned more about that red hill formation since that time?

A I have verified the statements made at pages 1100 and 1104, and the one you read, and many others, since that time and probably learned some more about it.

Q Mention was made a littl while ago of the Stowell wells, which wells seem to have been referred to and described in that case of McPherson against the Cucamonga Fruit Land Company, as well, probably, as in this case; they have been repeatedly mentioned here by the witnesses in the testimony: What do you understand by the Stowell wells?

A I understand that well number 14 on plaintiff's Exhibit

"Q. Now, Mrs., is there any written book in your opinion, in my possession, as detailed to by any of the witnesses for plaintiff?

"A. I have not been able to find any indication of any book.

"Q. In your opinion is there one?

"A. In my opinion there is none.

"Q. In your opinion is there any material book in any possession, as testified to by any of the witnesses for the plaintiff?

"A. I think I have already stated that in my opinion there is no book; that this has still in a complete, efficient working condition, as demonstrated by the foreign chemist.

Cross-examination:

Q. I am testified, and in answering the last question I believe to such I was strongly stated as page 1132 and 1106 of this same transcript; I then referred to statements on pages 1100 and 1102 of the same transcript.

Q. Have you included more words that you will furnish after this time?

A. I have verified the statements made at pages 1100 and 1106, and the one just read, and many others, those that have subsequently learned some more about it.

Q. Another was from a letter-copy of the Donald Sally, which was made to Miss Dear referred to and therefore in that case of Mrs. Sally regarding the Commonwealth Trust Company, as said, previously, as in this case; they have been repeatedly mentioned here by the witnesses in the testimony: what do you understand by the Donald Sally?

A. I understand this will another 14 on plaintiff's Exhibit.

1 1, and well number 4, have been referred to in that manner,
2 both of them.
3 Q Wells which discharge into the Radie tunnel?
4 A Those wells both discharge in o the Radie tunnel.
5 Q There were one or t o others were there not?
6 A I don't think they have been referred to as Stowell
7 wells; not that I know of.
8 Q The well number 4 is that on the 90-acre tract, the one
9 you mention as number 4?
10 A I don't so understand it, if you mean number 4 as the
11 plaintiffs have numbered it, in this case, it is off the 90-
12 acre tract; it is on the two-acre tract or two-and-a-half-
13 acre tract.
14 Q Adjacent to the 90-acre tract?
15 A Northwesterly from the 90 acre tract.
16 Q That well number 4 has sometimes been referred to as
17 the '96 well, or 1896 well?
18 A I believe that is true; I think that has been referred
19 to in that manner.
20 Q Having been dug or bored in 1896, in that year?
21 A Yes, I believe that is right.
22 Q In fact I suppose at the time of that Macpherson case,
23 that well was probably the principal Stowell well?
24 A Well, It was the only Stowell well that I know anything
25 about in that case; there were some other wells there but
26 I don't know as they were called the Stowell wells.
27 Q I will ask you whether you were interrogated and gave
28 testimony as follows in the Macpherson case referred to, page
29 1106, line 26? You have it before you, have you?

I, and will remain, a, have been motivated in my lifetime, both of them.

Q: Hello, Bill! Remember talk the Hello Tommy?

A: There walls back Hollywood during Hello tomorrow.

Q: There were one or Hollywood Hello walls?

A: It sa's hard they have been referred to as Hollywood walls; are that I know of.

Q: The wall number 2 is hidden the Hollywood hills, one one you mention as number 4?

A: I don't be understand it, if you mean number 2 the Hollywood hills be numbered 4, in 90's room, it is not the Hollywood hill; it is on the two-more road or two-half-lane road.

Q: Adjacent to the 70-acre tract?

A: Furthermoreby from the 70-acre tract.

Q: That wall number 4 has never been referred to as the 'Bill wall', or 'Bill-wall'?

A: I believe that is true; I think that been referred to in that manner.

Q: During your day or have in 2000, is Bill gone?

A: Yes, I believe that is right.

Q: In fact I suppose at the time of this interview that wall was probably the original Hollywood wall?

A: Well; It was the only Hollywood wall that I have anything about in that time; there were some other walls there but I don't know as they were called the Hollywood walls.

Q: I will ask you whether you were interrogated and give testimony as follows in the transcript that referred to, page 1264, line 20: "Do here is Hollywood wall, yes."

A I have it before me.

Q "Q Now, I will ask you from what sources in your estimation the gravel bed from which the Stowell wells are obtained-- where the supply of that gravel bed comes from?

"A Along in time of rains in the mountains, the valley is filled up with material more or less pervious, nearly all pervious on the surface in the immediate vicinity, both running east and west from the red hill. Whenever there is precipitation of rainfall on the mountain range adjacent and upon the valley, the water which falls on the valley is filtered into the soil, a very large portion of it, finding its way down into the voids, going in almost a perpendicular direction by filtration. In addition to that there are volumes of water discharged from the various gulches and canyons which drained the mountain range on the north. These flood waters in passing over the soil below the mountains, both in the washes and where it spreads out between the washes which it very frequently does,--,the result is when they pass over the soil that a large portion is absorbed by seepage or infiltration into the soil. And when that water is thus absorbed it takes a slanting direction through the soil until it strikes against the permanent plane of saturation which permeates the whole valley; and when it strikes that it becomes part of the permanent plane and goes into the general movement of that plane of saturation. At this point where that Stowell well is situated we find that around that red hill there is intermingled partially pervious deposits with the soil of the valley,

and the movement of the plane of saturation is retarded and cannot go to the lower levels as if there was nothing to retard it, and the great resistance caused by that retardation almost checks the velocity of percolation down to the plane of saturation. The checking of that results in bringing the plane of saturation to the surface, backing up the water, in a sem-reservoir condition. It is not a perfect reservoir because there is some movement; but the resistance is so great that the movement is very slow and it results in having the water stored in the more permeable deposits intermingled with clay, so that they are held there by reason of that.

"Q And what would you say of the waters of the valley being in contact with each other from Redlands and San Bernardino down to the sea?

"A I have no doubt at all but that such is the condition The only thing we find there, is a depth to the plane of saturation, and that is governed wholly by the resistance which it meets; and where those red hills and partially impervious obstructions occur, the movement is intercepted and the plane rises, but where it has a freer escape it drops down deeper."

Did you so testify at that time?

A I did.

Q I inquire of you further, whether you were further interrogated in that case, and answered as follows, at page 1087, line 5:

"Q Would not the tendency be, if a well were sut down in a mass of gravel, that was simply bearing seepage and percolating water, would not the tendency be as the well was begun to be pumped and continued, that the supply would be decreased?

"A Yes; in proportion to the lowering of the water-plane; the extraction of the water from this material would gradually lower the water-plane throughout the basin, and the size of the basin which gives the area of the water plane as compared with the amount of water withdrawn, would determine the rate at which this decrease would occur. In a very large basin of saturation where the voids are filled, and in a very large valley like the San Bernardino Valley, the computations made on that subject demonstrate that the rate of lowering of the waterplane wouldx be very slow, unless the quantity should be much larger than anything that has ever been considered as being drawn from the mass of water."

Did you so testify?

A I did so testify.

Did you be healthy at that time?

A. I did.

Q. I daughter of you further, whether you were further interrogated in that case, and answered as follows, at page 1287, line 6:

"Q. Should not the testimony be, if a well water was down in a dug-out cavern, that the ultimate healthy surface and preventing water, would not the behavior be the well was wrong to be normal and healthy, that the supply would be diminished?

"A. Yes; in proportion to the lowering of the water-plane; the diminution of the water from this natural well would probably lower the water-plane throughout the basin, and the size of the basin which gives its name at the water plane is connected with the amount of water withdrawn, would lowering the rate at which this diminution would occur. In a very large basin of subsoil water but which was filled, and in a very large valley like the Los Angeles Valley, the consequences would be that which diminution has to take place at location of the maximum basin of very slow, unless the quantity should be much larger than anybody has ever been considered to bring down from the water of water."

Did you be healthy?

A. I did be healthy.

Mr Waters, Q. Mr Finkle, is it your opinion, that the basin of the older alluvium from the red hill toward the mountains is a larger depression, into which is placed the smaller basin, filled with the newer alluvium?

A. Yes, that is my opinion, Mr Waters, the depression lying between the red hills and the mountains.

Q. Somewhat but not entirely impervious to water in the dividing stratifications of newer material, which separates the bottom of the one basin from that of the other? That is to say that the dividing stratum between the upper and the lower basin is not entirely an impervious stratum is it?

A. That is true; it is only impervious in the sense of the clay being impervious.

Q. It is impervious as against movement but not as against saturation?

A. Not as against saturation; that is correct.

Q. Can we properly compare these two basins to two vessels such as two trays, or bowls or plates, one within the other, with a stratum of water gravel between the two, and the upper or inner one also filled with water gravel?

A. Not exactly; we can compare them to this extent: that there are two basins, in which the stratum between the two is filled with some water gravel, and a large amount of clay and silt, and the stratum above the upper one is filled almost entirely with water gravel, with very little clay and silt.

Q. Then the difference is in the constituent parts filling the one as distinguished from what fills the other, that is to say you claim the upper basin is filled with a more per-

[illegible]

[illegible]

[illegible]

permeable material, coarser gravel or purer gravel than in the lower one?

A That is true from a mechanical standpoint; the difference is that of consolidation and decomposition, and finer particles in the lower predominating than in the upper.

Q That is to say, you claim the lower is a more dense material?

A Yes, for the ancient alluviums were deposited so long ago they have decomposed more, and originally they were finer.

Q Is it also your opinion that one edge of the two plates or vessels is ~~xxx~~ elevated above the other edge? That is to say the edge towards the mountains is elevated at an elevation higher than is the edge of each of the basins, on the southerly side? The basins are both tilted? Not setting level, as you would hold two dishes or plates?

A My understanding is not just that way; my understanding is that the saturation between these two deposits which you call the basin ends at some distance below the mountains, say, as I have stated in my examination in chief, about a half a mile to a mile, some limit of that kind, and that there that does occur, the waters are separated entirely by this partition.

Q I am asking you as to whether these two vessels in which this water is collected are not tilted, or do they lie immediately flat?

A I don't know what you mean by tilted.

Q I will make it plainer: I understand, or wish to convey the idea to you in my question, by the expression tilted, to

mean this: That the edges of both these basins, containing this gravel and water, or finer gravel in one, and coarser in the other, that the edges of both these basins, one in the other, toward the mountain, have a higher elevation than the edges lying to the south of the same basins have.

A. Well, that is true; if you state it that way I agree with you; I didn't understand what you meant by tilted.

Q. If I were to hold two plates in my hand, one within the other, and hold them level, you would understand they were not tilted wouldn't you?

A. Yes, sir.

Q. And if I raised up one edge higher than the other you would understand that they were tilted?

A. Yes, sir.

Q. I understand you agree with me that the edge next to the mountain is tilted, has a higher elevation than the edge toward the plain on the south?

A. Yes, with your explanation, that is true; in other words I agree with you, that the rim of the basins is higher near the mountains than it is down near the Red Hills.

Q. Now, then in receiving the supply of water, the water the water comes from the northerly or mountain side does it not, into both of these basins?

A. It does.

Q. In receiving this supply of water, the water all comes from the mountain side, from the northerly?

A. All from the north side, and from the mountain water shed to the north.

Q. Now, in receiving this supply of water, coming into the

upper edge of each of these two basins, which basin will first receive the water, the lower or the upper one?

A The upper basin which extends further up than the lower one, as the explorations and investigations in the foothills show that the deposits in the upper basin overlie the lower one, where the rim has ceased to divide the two; therefore the rainfall which comes down on the surface first goes into the upper formation, where there is no dividing rim between that and the lower.

Q What is it that constitutes the bottom of the upper basin on the northerly edge or rim as you call it?

A On the northerly edge of the upper basin?

Q Yes?

A The upper basin has no bottom at the end; the gravels extend over the ends of the lower stratum, and there is no bottom at the upper end.

Q According to that then, we will find at some point immediately at the base of the mountains, where the streams debouch into the valley formation or fill formation, we find there a mass of permeable gravels which immediately overlie the lower reservoir or basin do we not?

A Yes, without any saturation of clay strata or deposits between the two.

Q At that point you haven't got to the floor of your lower basin yet have you?

A No, sir; we have not

Q Between that point where the water gets out into the gravels, it has to travel some distance, before it gets to the floor of the upper reservoir doesn't it, some distance?

upper edge of each of these lateral bodies, which lands will
plant overlap the lower, the lower or the upper edge
of the upper lands in the anterior direction to that the
lower one, in the equipment the investigations in the
facilities with that the thumbs in the upper lands overlap
the lower one, where the rim has passed to strike the key,
therefore the valvular lands cause loss on the anterior
first lower that the upper frontals, which have to be di-
vided the between that and the issue.

- That is it that substitute the bulbs of the upper lands
on the anteriorly edge or rib as you will.

- In the anteriorly edge of the upper bulb.

- Two.

- The upper bulb has an bulbs at the end; the gravity
which over the edge of the lower bulbs, and there is no
bulbs of the upper end.

- Lastly in that case, we will find is some point
anteriorly on the edge of the upper edge, where the pressure
assumes like the entire formation or full tension, so that
there a sort of pressure causes with sensitivity towards
the lower convexity or back to my self.

- Now, attach my automatically air-valve or opposite
bulbs the two.

- In that bulb you usually put in the floor of your
lower bulb the one.

- In, air in here bulb.

- Between that yields where the minor gets and lets the
gravity, if you is usual some distance, before it gets to
the floor particular pressure usually is, some distance

A The floor of the upper - you mean the floor of the lower?

Q The floor of the lower?.

A Oh, the floor of the upper?

Q Yes, sir?

A Yes, it has to travel some distance.

Q Now, then as it is traveling that distance, isn't it trying to seek the center of the earth by gravity?

A It is by all means.

Q Will not as much of it as is permitted by the fineness or coarseness of those voids, will not as much of it as possible go into the lower basin before any of comes down into the lower basin?

A Yes, that is true with this limitation: that in large floods the floor of the upper basin does not have sufficient porosity to transmit all of it down, and that extends or comes down beyond the point where it can sink into the lower.

Q At a certain flood stage of the supply, when the water furnishes too much of a supply or an overplus, over and above that can be absorbed in those voids above the upper rim, as you call it, of the upper basin, there is a certain ~~xxxxxx~~ overflow which will reach into the upper basin, although the upper one may not be full?

A Yes, to express it I think more concretely, when the floods are small, so that the voids in the fill, in the upper basin are capable of absorbing all of the water discharged in the distance where there is no diaphragm or separation, all of the water will go into the lower basin, or lower alluvium; when the floods are larger, the surface flow

which passes further down goes into the newer alluvium, or ~~xxxxxxxxxx~~ upper basin.

Q. Let us take up another condition: If the lower basin becomes full, and it did become full, in a state of nature, didn't it, in ages past, it became full, the lower basin?

A. I have no doubt but that from indications at the Red Hills, that there was a time before any diversion or artificial interference, that the lower basin was constantly full.

Q. After it was once full didn't all of the supply of water under that condition, run over the filled voids above the lip of the upper basin, and run into the upper basin?

A. They would under that condition; all of the water supplied would be tributary to the upper basin, as there were no voids in the lower to take it.

Q. Haven't you run across this condition: That when the lowerbasin is full, or where you have an artesian condition of water, confined between two strata, and there is given to this space between the two strata, or as in this case, between the twobasins, between the lower basin and the upper basin, if you have a greater supply of water in that lower basin than can run out at its outlet below, and there is a supply running in, and continuing to run in, don't you find that the lower basin will overflow into the upper one?

A. I think not; I think that would be carrying it too far.

Q. See if I can't give you an exact illustration: Don't you remember that that is the identical condition which prevails in the artesian belt of the San Bernardino Valley,

causing these springs which from time to time have existed on the northern boundary or northern lip of the artesian basin, for instance Town Creek, isn't it just an illustration of that condition, that it does have that effect of forcing this artesian water out in springs, as you testified in the Barton case, and that that accounted for the water on the John Barton place, and the springs on the Hart tract north of town?

A Now, Mr Waters, when you make that statement I wish to answer it with a somewhat extended statement.

Q All right; we want to get the truth here.

A In this Cucamonga formation to apply the principle which you have just mentioned would in my judgment imply that water would flow backwards, and that there would be sufficient pressure to force it out at the upper end, and I can't agree to that; conditions are so different as between the San Bernardino basin and the Cucamonga Red Hill formation, that it would require considerable of an explanation, the same as we had in the Barton case, to analyze it; unless you really wish me to go into that, I don't care to go into Town Creek and these other matters, but I can go into that as an illustration of one phenomena of the phenomena of artesian basins if you wish it.

Q Well, all right; I just want your answers; if you can't agree to that I will ask you this; we have this anyway: If we assume that there is not enough outlet about the Red Hill, or we will call it the northerly side of these two basins, if there is not enough outlet for the waters of the lower basin on the south side, the lower basin

would somewhat fill it, wouldn't it?

A It would fill up to the point where it is segregated from the upper.

Q Then all of the water would run into the upper?

A All the water coming down would run into the upper; that is what I was saying, that we could not go any further, that we could not force the water out, because it was higher.

Q We couldn't get any more into the lower basin than it would hold?

A Not after it became filled; but in this connection we must remember one thing: that always in a state of nature, before there was any artificial development, this lower basin was discharging water, and therefore it was always drawing some water to make up the deficiency.

Q It would always be drawing as much as it discharged and no more?

A Yes, sir.

Q And keep that much out of the upper basin?

A It would deprive the upper basin, out of what was discharged at the ~~upper~~ lower end.

Q Since these two basins have a common source of supply, and no source of supply which is not common to both, now can you say as you did the other day, that the water of either is distinct from the other?

A In saying that as I remember, I referred to the point below which they become separate; at the point where no dividing rim exists, they are not separate, they are the same waters and are in contact, and in contact which will cause circulation, by the seepage of water from the upper to the

lower strata.

Q. They do become separated by depletion?

A. By depletion of the lower basin they become separated.

Q. When the lower basin is full then they are in contact at the upper rim?

A. Yes, sir.

Q. There is also another time when they would become separated. That would be in the event that such dry seasons occur as not to supply sufficient to keep up the outflow from the lower basin.

Q. When there would not be enough to keep up the drain, that might be made upon the upper basin, the lower one might be full, and the upper one partially, which would sever the connection?

A. Well, that would not influence the lower one.

Q. But they would become separated under these conditions?

A. Yes, sir; they are always separated below the point I mentioned, when the supply is not sufficient they may be separated above.

Q. How can water flow into the upper basin from the mountain canyons or slopes unless such water be overflow water that cannot enter the mouth or notch or intake of the lower basin?

A. It cannot, except under one contingency, and that is that the bed of the stream becomes so silted from lack of heavy storms to tear it up, that the water would run too far down, and would therefore pass the point where it would enter the lower basin.

Q. From what you know of the climatology of that country, you know that the winter storms break up the beds of the

streams in that section of the country?

A. Except in years like we had about 1899-1900, when there were not enough heavy storms to disturb the silt in the streams.

Q. Did they silt up so as to form an impervious condition xxxxxx in the bed of the stream?

A. In there in that neighborhood that was not the case because the stream was diverted in those years by the Lessee Company.

Q. So that silted condition could not have existed there at that time?

A. No, the water was not running; it was taken away.

Q. In a state of nature, and before the Indio tunnel and wells were made wasn't the lower basin kept full to overflowing at its upper edge into the upper basin, so that the supply went into the upper basin?

A. It was undoubtedly kept full to overflowing if you mean by that that it went into the upper basin; with the possible exception that with a series of three dry years like those we had, the inflow might not have been sufficient to supply the natural outflow from the lower basin.

Q. In that event the upper basin would get no supply at all would it?

A. The upper basin would in that event obtain no supply, unless the contingency should occur which I refer to,- the silting of the bed of the stream, so that it would run down beyond the point I mention on the surface and supply then the lower upper basin.

Q. Have not the artificial openings in the lower basin toward

the lower side thereof made a draft upon the lower basin enough to empty the same wholly or partially, so as to prevent a great portion of the water supply entering the upper basin by overflow, as before stated?

A. Yes, I firmly believe that is correct; I think that the sinking of wells in the old alluvium, which is outside but that you call the lower basin, has lowered the supply, so that it has caused less water to be supplied to the upper basin by entering the upper formation or recent alluvium than formerly; that accounts for the rapid fall of the waterplane on 16th street, since the year 1890.

Q. In your opinion, have not both the southerly sides of both basins been materially fractured or broken, so as to have caused leakage from both basins, causing the Sunnyside Springs to exist and flow?

A. The Sunnyside Springs are in count caused by leakage from the lower basin and not the upper.

Q. Assuming that the lower basin is left full in a state of nature, and the upper basin is left full, as much as in a state of nature it will fill, it will never fill to the absolute surface will it?

A. No. It can't do that because of the freedom with which it can flow to the southwest.

Q. Yes, then if the lower basin is full, and the upper one is full in a state of nature to that extent which gravity will allow it to be according to any theory, the eastern or the western escape, will not some of that water flow into the Sunnyside Springs, out of the upper basin as well as out of the lower.

A. I don't think so; I have never seen any evidence that we would warrant me in assuming that the water plane in the upper basin would ever reach an elevation which would feed the Cucamonga Springs.

Q. You have done a good deal of testifying in regard to pumping and pumping averages: I will ask you if this pumping business is not a voluntary spasmodic act, dependent on the will and the machinery, and the acts on the part of the people, as well as the water level?

A. That is true, with the limitation that a certain class of material will produce only a certain quantity of water or allow only a certain quantity of water to pass through it, and if you apply more power in the way of pumping it will only create a vacuum which will not be filled with water.

Q. Then it is spasmodic but it is limited?

A. Yes, sir; it is dependent in a measure on the power of the pumps, and the will of the people operating them, and the kind of appliances used. The final limit is the amount of water which will percolate to the well.

Q. So an average pumping measurement, is the measurement of voluntary spasms of pumping isn't it?

A. I so understand it.

Q. If you take a given period of a certain length of time, and give the quantity pumped in that time, there is no limitation in your computation as to how much of the water was pumped during any one period or part of that time is there?

A. I don't understand that there is.

A. Council Bluffs and, I hear, Omaha are critical and do
really mean to do something about the water plant in the upper
Maple. Would anyone care to elaborate which would lend one
Omaha Spring.

Q. Can have done a good deal of investigation in regard to
pending and working conditions. I will say yes if this proposi-
tion Bluffs-Omaha is not a relatively economic and, especially as
the will and the availability, and do note, as the pair of the
people, as well as the water level.

A. That is true, with the limitation that a certain class
of material will produce only a certain quantity of water
or other only a certain quality of water is pass through
it, and if you apply more power it has any of pumping
it will only create a vacuum which will not be filled with
water.

Q. Then it is economic but it is limited.

A. Yes, this is dependent on a balance of the power of
the pump, and the will of the people operating them, and
the time of application work. The final limit is the amount
of water which will percolate to the well.

Q. Do an artesian supply particular, is the measurement of
volumetric quantity of supply the well?

A. I do understand it.

Q. If you have a given period of a certain length of time,
and give the quantity pumped in that time, there is no
limitation in your computation as to the size of the water
and power. Suppose only one pumping at part of that time is
there?

A. I don't understand that there is.

This whole proposition is not pressing overmuch which came out incidentally in Mr Pritt's examination last evening arose from a statement I made: that taking the average of the records from one well, and the average from another, it proved that one had failed more than the other; it may be that that does not prove anything, but taking it on the theory of probabilities, one well might have been influenced as much by lack of effort as the other, there may be something in it; and I was merely stating what the figures showed; you understand that it is not anything that I have any personal knowledge of as to the actual fact; if there is any conclusion to be drawn from the figures the conclusion that I gave is the one.

Comparing that which has been brought here and called here as proved averages, and rainfall measurements and all that kind of thing, what in your opinion would be the comparison, as to the accuracy and trustworthiness of that kind of an estimate, of the quantity of water, or the annual flow of issues derived from any certain source,- not could that compare with a delivery record at the other end of the pipe, where the water is actually flow out?

Mr McKinley: Objection to as not proper cross examination.

The Court: Overruled.

A I entirely agree with you; if you have a record of the delivery of the flow of water at the end of the pipe, with a perfect weir and clock register, you would have absolutely conclusive evidence of the flow of the water; but we didn't have that in this case, and I used the best we had; I would not use something only what I had; I used the figures in the

record from which I came to my own estimate and the best presumption I could, and I admit that better evidence could have been obtained if the proper records had been kept.

Q. You may recall some various complaints in your cross examination by Mr Platt, between the well number 3 and the well number 8, and you have based it on an assumption that you made in 1900: now in 1900 well number 3 was not, wasn't it?

A. It was.

Q. The well number 3 was old wasn't it?

A. Well that statement I could only say yes to.

Q. When was well number 3 dug?

A. Well number 3 was dug in one fashion or the way back as far as 1892, or 1890 may be; and in the latter part of 1899 and the early part of 1900 number 3 was entirely recored with a larger size; there was only a nine inch pipe in it and it was shallow; and it was entirely recored, and was practically made a new well at that time, so that practically the two wells were similar in that respect.

Q. Do you mean there was no pumped cone of depression, or no voids under the smaller well?

A. No, sir; I don't mean that; but the same condition also applies to the Kendall locality, because while well 8 had not been in existence, there had been an old well in existence there which was pumping more or less for a considerable time, many years previous to the boring of well number 8; therefore I think that honors are even on that score between those two localities.

Q. Now, your so-called replacement from 11th street, -

isn't that so-called replenishment into what you call the spill-way and not into the basin at all?

A From San Antonio Creek?

Q Yes, sir; from both streams.

A I think that replenishment may properly be said to be in the upper part of the spillway.

Q How can you charge that to me?

A Well, I am not charging it on to anybody; I say by filling the outlet it tends to hold water back in the basin.

The Court, Q Proceeding on the theory of our basin superimposed above the other it would be possible I assume to pump water from the upper basin and still leave the lower basin intact?

A Yes, sir.

Q Could it be possible to reverse that process, and pump water out of the lower basin and leave the upper basin intact?

A Which pumping from the lower basin, the more you take out of the lower basin, the more it would injure the upper basin, because the more voids there are in the spaces where the two are in contact the more the supply is withdrawn from the upper one.

Q Then your basins have holes in them?

A There is a common point of contact at the mountain where the water is not under pressure.

Q Taking the illustration of the two basins vertically tilted one within the other,- can you pump water out of the upper into the lower or vice versa, unless there was some means of ~~connection~~ communication between them?

A At the lower end there is no means of communication between

them; the means of communication are only of the upper one.

Q I am speaking about the lower portion.

A The lower portion, they are separated, because the elevation of the ancient alluvium lies higher than the cement, at the lower part of the basin, and I don't think there is any connection there, except as I have stated, where water leaks out of the ancient alluvium, ~~xxxxxxxxxxxxxxxxxx~~ causing the springs, and the water in that case in the springs may be alkaled with water on the surface or near the surface from the upper basin; and I would hardly call that communication because it is only surface water from the upper basin.

Q To what extent can you draw the water from the lower basin and still keep the upper basin waterlogged?

A I think drawing the water out of the ancient alluvium or lower basin would not affect the supply that has already entered the upper one, but it would take away a substantial amount of the supply which would otherwise reach the upper basin, because the voids in the spots where the two are in contact would be increased, and therefore the infiltration into the lower would be accelerated, and that would be at the expense of the upper or recent alluvium, so that all of the injury which occurs by reason of interference in the lower basin is limited to the foothill region where the two are in contact.

Here the Court taken a recess until tomorrow April 9, 1909, at ten o'clock a.m.

J. . McKinley.

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co.,

Plaintiff

vs.

San Antonio Water Co.,

Defendant

Vol. 49.

Friday April 5, 1929.

INDEX.

Finkle, F. C. (Weibers)	4406
" " " (Haskell)	4408

I. BENJAMIN, Official Reporter

Friday, April 9, 1909. Forty-ninth Day.

F. C. FINKLE.

Cross Examination resumed.

Mr. Waters: Q Mr. Finkle, isn't it a frequent occurrence that the overlying stratum of the artesian conditions in a water plane is semi-impervious, so as to form springs of surface flowing water emanating from the artesian compressed basin?

A Yes; that is a frequent occurrence in many basins, and usually occurs at some point in nearly all artesian stratifications.

Q That is to say, the overlying crust, if you might so term it, is not absolutely impervious in all of its areas.

A That is correct ; in all of its areas it is seldom that you find it absolutely impervious. There are artesian basins in some parts of the country, like in sandstone formations, that are that way; but in this state I have never seen an artesian basin where all the overlying strata are absolutely impervious.

Q The overlying strata in this part of the country you find to be clay?

A That is the usual thing; sometimes they are silts.

Q Now then isn't this a reasonable assumption: That when the overlying mass which is non-artesian is dipped and tilted, isn't it a reasonable assumption that there may exist fissures and cracks or leaks in the overlying crust at such a depth beneath the surface as not to make springs upon the surface but yet to have a partial supply of water coming from the lower into the upper stratification or

mass without coming to the surface in the shape of springs at that point?

A Well, that is wholly speculative, but it might be possible in some cases, and I suppose if it were so it would be extremely hard to determine, because such springs would mingle with the surface water and you couldn't distinguish one from the other.

Q That is what I am coming at. The next question is this: If there is such an exudation or leak from the stratification into the upper and at such a point beneath the surface, owing to the depth of the overlying matter, so that it does not expose itself in the shape of springs on the surface of the ground, wouldn't it follow then that this water so escaping from the artesian basin would cease to be artesian when it came into the upper mass? Would it not then become a surface mass which would not have any pressure after it got into that mass?

A Yes; after it had percolated upwards as high as the force from below would send it and had then assumed a direction as to its movement in conformity to the other surface water plane.

Q It has become part of the surface water then?

A After that lapse of inflow and distance it would have become a part of the surface water.

Q Now then, if there is a leak in the overlying crust of this which you term the artesian basin or condition,-- if there is such a leak and it gets into what you term the newer alluvium, isn't it then just the same as all the balance of the water in the newer formation, and loses its

artesian or pressure character?

A Yes; on those assumptions you make, after that had occurred (assuming that it could occur) it would have lost all its characteristics as artesian water and would ~~by~~ be no longerunder pressure and would be simply moving towards the outlet of the recent alluvium.

Q Moving fast or slow as the other water with which it mingled was moving fast or slow?

A It would be just the same as the other water.

Q Whatever condition the other water was, that would be its condition after it has escaped from the artesian condition?

A You are right in that, I think.

By Mr. Haskell:-

Q As I understand it, you have made calculations of the run-off of storm waters from the curve which you denominate the Arrowhead curve.

A Not the storm run-off; all the runoff
It is not limited to the storm run-off.

Q Now this Arrowhead curve you assisted in computing yourself, did you not?

A I assisted in the investigation which made up the curve and had charge as one of the consulting engineers in preparing the data and collecting it.

Q That data is founded on what you found to be the rain fall at different elevations north of the summits of this mountain, is it not?

A Well, I won't say that itm is founded on that. It is founded on the run-off and rainfall on those watersheds and

the run-off is expressed in a function of the rainfall. It is not founded on the rainfall alone, but on the rainfall and the run-off.

Q Now you found in your investigations that near the top of the mountain you had a greater ~~run-off~~ rainfall, did you not? At the higher elevations there was a greater rainfall than at the lower?

A Yes; we find that.

Q Now did you find in that computation that the run-off increased in greater proportion than the rainfall?

A Yes, sir; the curve shows that; the curve itself, which is drawn from these observations, shows that as the rainfall increases the curve ascends and the proportion of run-off increases rapidly as the proportion of rainfall, increases.

Q And what relation did you find between the rainfall, say, at 6000 feet and the rainfall at San Bernardino, generally speaking?

Was it two or three times as great?

A The mean rainfall?

Q Yes; approximately. I don't care for exact figures.

A It bore a ratio very close to the government rule, an increase of .6 of an inch to the 100 feet up to 6000 feet.

Q That would make it two or three times as great as at 1000 feet?

A Not in that way. .6 of an inch increase for each 100 feet.

The Court: Q You refer to a government rule: Do you mean

the Newell curve?

A No; the hydrographic rule for the acceleration of rainfall. The Newell Curve is a run-off curve.

Mr. Haskell: Q Stating it approximately, if the rainfall at San Bernardino, which is approximately a thousand feet, is 15 inches, then at 6000 feet it would be approximately 45 inches?

A Yes; that is the way it varies; it happens that at that elevation it would be three times what you estimate to be in San Bernardino.

Q Now, you say that the run-off increased in greater proportion at those relative altitudes?

A As to the depth of rainfall, no matter what the altitude is.

Q What was that ratio of increase approximately?

A I think the tables I testified to the other day would give you a pretty close cue to the ratio of increase. I will refer to the table which I gave of run-off of, say, the Deer Canyon watershed. When the rainfall was 22.6 inches deep the run-off per square mile would be .4 of a second foot.

Q At what altitude?

A It doesn't make any difference what the altitude is. It is the depth of rainfall which influences it. The ratio of the run-off is proportional to the depth of rainfall, whether it is on a lower or higher elevation.

Q Doesn't the percentage increase with the rainfall? Suppose you have only 8 inches, approximately, such as we have had in some years past: Are you getting as great

a percentage of run-off on 8 inches as you would on 20 inches?

A No; you wouldn't; but that would be true whether that 8 inches fell at a point 1000 feet above sea level or 6000 feet, assuming your surface to be the same all the time.

Q Take a season where the rainfall at San Bernardino is 8 inches: You compute then that at 6000 feet there is how much rainfall?

A 38 inches.

Q 8 inches here and 38 inches at 6000 feet?

A Yes; the increase being .6 for every 100 feet, for 6000 feet you would have 38 inches.

Q Now then , when it is 8 inches here you say it is 38 at 6000 feet, and when it is 15 inches here you say it is approximately 45 inches at 6000 feet. Now at an altitude of 6000 feet how much run-off would there be more in one case than the other?

A I can tell you the proportions from the Newell curve which I have here in my book. I happen to have the figures here--

Q Using the Arrowhead curve. Let us stay with that.

A I can use the Arrowhead curve but I can't give it to you in inches but in second feet. For example, to illustrate that, if the rainfall is 39.4 inches by the Arrowhead curve, which is very near your question,-- but if it is-- By the way, I have the curve here. With 38 inches the run-off would be 1.25 second feet per square mile; and with 45 inches 1.7 second-feet per square mile, according to the Arrowhead curve.

Q Now, I believe you have told us that without interference that you estimate that the run-off in the Cucamonga basin is absorbed to the extent of only 20 ~~in~~ per cent.

A No; I think you misunderstood me.

Q What are the facts?

A I stated that the water flowing in channels from that run-off, if not interfered with. (not speaking of the water which is absorbed on the surface before it gets into the channel) but speaking of the water in the channel, as to that water 20 per cent. would be absorbed between the mouth of the canyon and Base Line.

Q As a matter of fact, for the purposes of this case, that is about the only water that we can consider, isn't it? There isn't but very little ~~wat~~ of that water that flows on the Cucamonga basin that ever penetrates to the saturated plane below?

A Yes, indeed, there is.

Q When there is 8 inches of rainfall?

A I am not speaking of 8 inches; I am speaking of the average rainfall.

Q Take it when there is 8 inches.

A There would be some difference, but much less than the average, because that is below the average. I doubt if there was ever 8 inches of rainfall in that locality over the whole gravel basin. But the proposition is that the gravel basin is extremely porous on the surface and when it rains heavily a large part sinks rapidly into the water plane.

Q In these hot dry summers doesn't that basin dry down three or four feet from the top?

A Yes, sir; but during the rainy season it soaks it up again.

Q But when it dries down to four feet it has a porosity you say of 33-1/3 per cent. The 8 inches then wouldn't sink only a little over half way into the four feet.

A I think your reasoning is wrong, because the water plane is deep--

Q You are misstating my question.

A Wait till I finish.

Q I will withdraw the question. My question is this, Mr. Finkle: You say this xxxx xxi top soil dries out to the depth of three or four feet?

A I think it dries much deeper than that.

Q In the heat of summer. Now you say the average porosity is 33-1/3 per cent.?

A Yes, sir.

Q If you put 8 inches on that it would go down a little over two feet: isn't that true?

A I don't see what will prevent it from going down deeper if the water plane is deeper.

Q You say the porosity and absorption of the soil is that much.

A That is the reason it would keep on going down,-- because it is porous.

Q How much will that soil hold?

A One-third of it is voids, as I estimate.

Q How much can you draw out of that?

A That is problematical. You might be able to draw out two-thirds of that.

Q But you have figured only one-half in your estimate.

A I haven't made any estimate on that.

Q Haven't you told the Court here that a certain amount of water pumped out of there would lower this water plane so many feet?

A No; I made a hypothetical calculation that on 10 square miles of basin with one-third voids, that taking so much out of there would lower it ~~xxx xxxx~~ so much.

Q And wasn't that calculation based on the fact that you could only take out one half of the saturation?

A No, sir; it was based on the fact that you could take it all out.

Q Do you think you can?

A No; I don't think you can.

Q Wasn't Mr. Trask's calculation based on the supposition that you could only take out one-half?

A No, sir; I understand his calculation is based the same as mine, that it all can be taken out. Then you can apply any coefficient you wish and correct it by that ratio.

Q How much do you think you can pump out of that?

A If you want my opinion, I would say that you can pump out from two-thirds to three-fourths of the saturation in that coarse soil.

Q Do you think you can pump out of that any more than you can pump out of the basin below the dike of the Santa Ana River?

A Yes; because it is much coarser.

Q Isn't that below here practically all river wash?

A Yes; but it is fine sand. It is very different from this.

Q Turn to the table on page 2493 of the transcript of this case.

A I have it.

Q Assuming that the rainfall for this year is in fact 17 inches-- What does that rainfall on that record show it to be?

A Which year do you mean?

Q 1908-09.

A That season is not yet completed; it is only given up to February.

Q Assume it to be 17 inches, and I will supply the testimony to show what the fact is later on. Assuming it to be 17 inches for 1908-09, the total rainfall for the 8 preceding years, including 1908-09, would be 151.75 inches.

A Do you want me to verify that calculation?

Q No.

A I don't know whether it is right or not.

Q This record speaks for itself. But you may verify it if you like.

A I will leave that to you.

Q All right. The rainfall for the eight years preceding that, beginning with '91-2, was 112.50 inches. That shows that the rainfall in the last eight years was 39.25 per cent. greater than it was in the eight years preceding?

A I think there must be some mistake in your figures because you are beginning with '91-2. That goes back much further than 8 years.

Q Nine years. Periods of nine years. I will correct that. This rainfall shows that the total rainfall for the last

nine years, including 1908-09, and assuming that the rainfall up to the present time of 1908-09 is 17 inches, is a total of 151.75 inches; the table also shows that the total rainfall for the nine years preceding that period was 112.50 inches; showing that the rainfall for the last nine years is 39.25 per cent. greater than it was for the nine years preceding. You can verify that if you like.

A. I am not verifying it; I am simply writing down your figures. What is the question about that?

Q. Now then, it has been shown here in the evidence that approximately all of the rainfall for the last four or five years has been distributed over the flood plane of the Cucamonga basin and a nominal amount of it has escaped. It has been shown here that the defendants in this case practically began their pumping operations within the last period of rainfall mentioned, and also that within that period they have increased the output of the Lady Tunnel something like two or three hundred inches in the irrigating season.

Q. It has been shown in evidence here that in 1900 the water plane stood approximately 20 feet higher than it does at present, at a time prior to most of the pumping operations of the defendants, and at a time prior to the greater increase of the output of the Lady Tunnel. And it is shown here that the water plane instead of being ~~normal~~ normal, after a period of nine flush years of rainfall, has greatly depressed, notwithstanding the fact that in the prior period of years or of rainfall which I have mentioned and at the end of that period the water plane stood approximate-

ly 20 feet higher than it does now. Now, considering all those factors, how do you account for that depression?

A That is very easy to account for, because you leave out some of the other factors which are equally as well shown in the case, namely, that the water plane from 1890 to 1900 and the flow of Cucamonga Springs from 1890 to 1900 fell more rapidly than they did from 1900 to the time you mention; and you also forget the fact shown in the evidence in this case that the full effect of a dry year and the full effect of a wet year is not felt immediately, but only to a partial extent, and it requires a great many years for the water to travel and reach the lower sources which are feeding the lower water plane.

Now, if you take all the facts which I have mentioned and which you have mentioned, there is nothing at all to establish the theory that you argue in your question. On the contrary, it shows that for the last four or five years the effect of the return of the seasons has been rapidly felt in elevating the water plane, and that the greater part of the shrinkage which it sustained has come back during this period.

Q The testimony here, some of it, if we accept it to be correct, assuming that it is correct that the spreading out of only 20 per cent. of the storm waters or run off goes into the ground on the Cucamonga plain, and accepting as true your testimony and Mr. Trask's testimony as to the amount that your clients or the defendants in this case have caused to sink into the ground, and assuming your estimate to be correct that in the last four or five years

the defendants have put in more water into that basin than they have taken out and consequently they are not to be charged with anything, either in the delay of this water moving down to where it formerly rose, or anything else,-- the water that they put in there in the last four years has squared their account,-- although the bulk of it was spread out away up near the foot hills,-- How do you account for the fact that this water plane has not been restored to its level as found at the beginning of the last period of nine years which I have mentioned?

A I account for that, Mr. Haskell, in this wise: In the first place, the defendants to whom you refer and who have called me as a witness are only two of the defendants in the case: The San Antonio Water Company and the Ontario Power Company; and while they may have squared their accounts there are numerous other defendants who have abstracted water from the formation. As to whether they have squared their account or any portion of it is not in evidence and I have no knowledge of it. Then again, the matter of the spreading of water, as I understand the testimony, shows that the water has been spread at all points of that stream-- all that could be spread has been spread near the mouth of the canyon, and what couldn't be spread near the mouth of the canyon has been spread lower down, and I do not for a moment assume that all the water which is spread out reaches the lower part of this basin.

Q Of course not. But do you mean to say to this Court that the water that you spread out or that the defendants in this case spread out near those foot hills has to actually

run to the 16th Street wells or the Cucamonga Springs before its effect is felt there?

A I mean to say that so far as the 16th Street wells are concerned it actually has to run to those wells before its effect is felt, and I mean to say also that so far as the Cucamonga Springs are concerned it has to run the greater part of the distance or a great part of the distance-- I am safe in saying the greater part of the distance-- before the effect is felt there, -- although there it would be felt sooner than in the 16th Street wells.

Q Am I correct in understanding your answer that you say that at the 16th Street wells that the water actually has to reach there?

A You are correct in understanding that as to the 16th Street wells.

Q Now in these cones of depression which are created by pumping plants, does the water actually have to run all the way from the extreme limits of that cone of depression to the pumping plant before its effect is shown on the water plane at all--

The Court: Q If water be spilled on the upper portion of the Cucamonga debris cone is it your opinion that it would be manifested at the 16th Street wells before the Cucamonga Springs or afterwards?

A Longer. Because the Cucamonga Springs derive their sources from pressure in the ancient formations. As soon as the water from spreading has reached contact with those pressure veins it is transmitted by pressure through these veins under a head.

Q You mean it would be manifest at the Cucamonga Springs before the 16th Street wells?

A Yes, sir; while to reach the 16th Street wells it has to percolate all the way, it is never under pressure in that formation.

Mr. Haskell: Q Isn't it a matter of fact that when the pumping plant starts operations and creates a cone of depression, that within a short space of time its effect is felt throughout the Cucamonga basin by setting every particle of water in motion towards the depression?

A In a basin of that character such ax a thing would be impossible. The conditions are not right for that kind of a proposition .

Q You made an examination of the conditions in the Perris Valley?

A I certainly did; a very careful one, as you well know.

Q And you madean examination there for three or four years didn't you?

A I think it was something like two years.

Q Three different years you were there going over those wells on that water plane?

A Yes, it may have been three ~~mx fawx~~ years. I was retained in the Newport case and made a careful examination in that valley.

Q Did you make a statement in regard to those pumping plants in the center of that basin that when you created a cone of depression that you set the entire water plane in motion, like tumbling down one brick after another when set up in a row?

Mr. McKinley: Objected to as not cross examination.

The Court: If you are going to take any examination on what he testified in that case, he should be confronted with the evidence.

Q Do you desire to see the evidence?

A I desire to see the evidence and then I wish to answer the question as to the Perris basin.

Q Well, I will see if I can find it for you.

Mr. McKinley: I will still object to it when you do. I don't ~~want~~ want to try any case but this one.

Q How long do you think it will take for the water spread out near the foot hills of the Cucamonga basin to make itself manifest lower down at the 16th Street wells?

A That is very hard to say--

Q That is, the effect.

A That is hard to say. We don't know the velocity under ground of the water at that point. We know it is slow; but how many years it would take in that recent formation, I wouldn't express an opinion on without measuring the velocity. We know it takes considerable time, from the records we have and from the experiments made elsewhere on similar formations.

Q Which has the greater velocity, the Perris Valley or the Cucamonga?

A It is a different thing altogether. That is a flat basin and it is more like a lake condition. In that case, you will remember, we showed practically no fall in that basin.

Q Which has the greater movement?

Mr. McKinley: Objected to as not proper cross examination.

The Court: Sustained.

Q Then you don't think or, at least, you have no opinion on the question, assuming that the 16th Street wells would affect the Cucamonga Springs-- assuming that to be true that they do and would affect it,-- you have no opinion as to whether or not the spreading of the waters by these defendants at or near the foot hills has yet had any effect in restoring the water plane at the 16th Street wells?

A I believe that it has up to this time had some effect, whether you assume what you assume or not; that some of the effect of spreading that water has been felt at the 16th Street wells; but I believe by far the lesser part has been felt, and that within the next two or three years the results of that work will be still more felt than they have been up to this time.

Q Does the level of the water plane at the Upland Water Company's well indicate that at all?

A The Upland Water Company's well is in the other formation and has no relation to the 16th Street wells. That would only indicate the pressure on the artesian formation.

Q How long do you think it takes to transmit the effect through the ancient alluvium?

A Less time than it does through the modern; but just how much less I couldn't state. The fact of that is easily shown by the rapid recovery of the Cucamonga Springs as compared to the 16th Street wells.

Q Assuming that what you say is true, that the spreading of the water at or near the mouth of the Cucamonga Canyon

had but little or no effect on the 16th Street wells, how do you account for the fact that during the winter time when there are no pumping operations going on and when the Lady Tunnel is partially closed that the water begins rapidly to assume its normal level?

A That is very easily accounted for. In the first place, when you stop pumping, there is a cone of depression which has to fill up before the water can assume its normal level; and then there is the rainfall falling on the gravel basin which sinks down to the water plane, and then the infiltration of the streams which run down to Base Line or across Base Line and all those things are helping and may help to recoup that water plane

Q How much did you say that you thought was being supplied by the storm run-off each year on the average to the Cucamonga basin?

A You mean the whole run-off?

Q Yes. How much did you say that was?

A According to the Arrowhead curve I said that 704 inches would be supplied, and that with thereplenishment of the San Antonio Water Company, taking the minimum estimate of that replenishment, 916.1 would be supplied, and with the maximum estimate the total would be 1011.8 inches. That by the Newell curve the natural would be 470 inches continuous flow, and with the minimum estimate of San Antonio Water Company's replenishments 682.1 inches, and with the maximum San Antonio Water Company replenishment 777.8 inches. Those are the figures which I have determined by my calculations.

Q That is based on the average rainfall?

A That is based on the mean rainfall for 38 years. It would be less in some years and more in others.

Q But in the last nine years the rainfall has averaged greater than your calculations, hasn't it?

A Yes.

Q In thelast nine years the average rainfall has been over an inch over the average or more?

A I haven't verified that. That will have to stand on your authority. You can assume it and if it is wrong there is no harm done.

Q Well, assuming that the average of the rainfall for the last nine years has been 16.86, according to the San Bernardino estimate or measurement of rainfall, then during that period you would have got a much larger benefit from the run-off in the winter time of the rainfall?

A I won't say much larger, because according to the figures you assume the difference is only about .9 of an inch above the average. You said 16.87, and the average in San Bernardino is 15.93; so there would be not quite an inch difference. There would be some more than my figures, but I won't say much more.

Q Because the run-off in coming on to the Cucamonga plain increases faster than the rainfall?

A The percentage increases faster. The percentage increases as the depth of the rainfall increases.

Q Now you have got coming into this basin on an average 916 inches, and in thelast nine years there would have been more than that, wouldn't there?

A Unquestionably. S one more.

Q Now there is the input into the Cucamonga basin, and you say it is moving slowly from the mountains down to the 16th Street wells?

A Yes, sir I do.

Q How far up do you think the cone of depression reaches at the 16th Street wells towards that input? To the mountains?

A No; it does not; it doesn't reach very far, as shown by the other wells when you pump them.

Q How far do they?

A We have no data. We know it doesn't reach very far, because when you pump one of those wells on 16th Street the effect is not felt very greatly on the others near by.

Q How much do you estimate is the average output in the last nine years from those 16th Street wells?

A I am not sure whether that has been figured , but I will say if it has. I haven't figured that for nine years. I had it figured for eleven years.

Q It would be about the same for nine years as it would for eleven years, wouldn't it?

A No; not quite the same; the first year it was only 50 inches. It would be a little more for the nine years than for the eleven years. I have figured the mean output for the nine years, 1900 to 1908, inclusive, and make it 96.7 inches continuous flow.

Q Now you say that in the last nine years there has been more than 916 inches of water coming into that basin?

A That is right.

Q Now if that is true why hasn't it filled up that depression caused by only a draft of the amount which you have stated?

A Because that is not the only draught. There are draughts from the recent alluviums by the natural outlet to the southwest; and there are draughts from the ancient alluviums in numerous places by numerous companies and wells and tunnels and natural springs, and because the 916 inches or more which you speak of is divided between all these formations, the recent and the ancient, and among all these different developments.

The Court: Q Before you go any farther, I wish you would specify what other companies you refer to besides the San Antonio Water Company and the Ontario Power Company.

A In speaking of the whole locality and replying to Mr. Haskell on the 916 inches tributary to both formations, I refer to all the others; I refer to the Cucamonga Water Company; I refer to the Sunset Water Company; I refer to the Ioamosa Water Company-- not the Ioamosa Water Company, but the Hemosa Water Company; the Old Settlers Water Company; and I refer to the plaintiffs as well as to the defendants, in the water which they receive from the Y Tunnel and Cucamonga Springs. In fact, to all of the draughts which are on the ancient formation in the Cucamonga neighborhood.

Q Do you include the intervenors?

A I do if they receive any water.

Q And the Sam Johnson well?

A Everything in that neighborhood.

Q Do you think all the water consumers, whether plaintiff or defendants are in some way affecting this plane of saturation?

A Yes; my opinion is that all the water consumers from the artesian or ancient alluvium are affecting that; and part of the water which Mr. Haskell is discussing goes to affect that; and that the San Antonio Water Company in the 16th Street wells and the Frankish & Stater tunnels and the San Antonio Tunnel are affecting these water supplies; that the natural outflow from the basin toward the Chino basin and the Santa Ana River and Mill Creek near Rincon is also depleting this basin, the natural depletion which existed long before there was any wells or any other invasion of this basin.

Q Am I to understand that the defendants are interfering with water which otherwise would flow out to the Cucamonga Springs?

A I am firmly of the opinion that the Cucamonga Water Company particularly is interfering on the east side with the Y Tunnel and the Cucamonga Springs by their developments on the Lone Star and the 35-acre tract and by the pumping of their wells in the same water strata which supply the Y Tunnel and the Cucamonga Springsx.

Q How about the San Antonio Water Company and the Ontario Power Company?

A The Ontario Power Company and the San Antonio Water Company are operating on the west side and for that reason have no relation to the east side and the Cucamonga Springs

Q But if I follow you correctly you represented to Mr. Waters that there was a relation between the so-called alluviums and the water therein contained.

A In yesterday's examination by Mr. Waters I stated what I have always believed: that in the belt near the foot hills there is an intermingling of the waters before they enter the two formations; and when Mr. Waters asked me hypothetical questions this morning I was not testifying to anything particularly except to answer his question.

Q You mean that there are cracks and openings through which the two can communicate?

A I said that the cracks in the vicinity of the Red Hill caused an escape of artesian waters, and at that point they would intermingle; but in the bottom of the basin I have stated in all my testimony that the tending of the strata would close up cracks rather than to make them.

Q You are referring to the bottom part of the basin, that is, where the 16th Street wells are located? I am trying to understand your theory here.

A Would the court permit me to take Mr. Trask's geological section and explain that?

Q I think I understood your former explanation, but simply your concluding statement in the latter part of yesterday and to-day-- your statements to Mr. Waters and Mr. Haskell, that at the lower portion of the basin there is some intercommunication.

A No; the upper portion.

Q I thought you said the lower.

A At the lower I said there are cracks and fissures in

ancient formation which has made the Cucamonga Springs and other springs in that neighborhood; but that creates no intermingling.

Q You don't think there is a crack between the two formations?

A No; because ~~it~~ at that point there is no recent formation over it. The intermingling is further north. The only intermingling which I have testified to and which I believe exists is in the belt at the foot hills ~~where~~ where the two waters are separated and are divided between the two formations, and I would like to diagram it on the chart.

Q I am simply trying to understand your testimony. I thought I understood you up to the time you answered Mr. Waters questions, and in your answers to his questions and some of Mr. Haskell's I thought I had a wrong impression.

A I think you did. Mr. Waters was asking hypothetical questions about artesian basins and I said as to all artesian basins that I know of in this state there were breaks at some points. In this basin there are breaks, but they are at the points where the cienegas and springs are escaping, where the recent formation does not cover the ancient formation. ~~xx xxx~~

Q He said one was superimposed over the other and he asked you if this particular formation was not practically that way.

A Last evening Mr. Waters was referring specifically to this formation and I testified about that formation. But this morning he asked me a number of hypothetical questions without mentioning this basin. His questions were general.

Q Yes, they were general, but they applied to this basin as well as any other, and that is why I was wondering if I misunderstood you.

A I didn't understand Mr. Waters this morning as mentioning this basin. He had a general question covering all artesian conditions; and I would state in regard to this that as far as answering his questions that there were breaks in the ancient formation, there are numerous breaks in the ancient formation in this artesian basin about the Red Hill, but I know of none anywhere else.

Q You were, then, proceeding on different theories? He was referring to breaks between the two formations and not a break in the old alluvium below?

A That might in a measure apply even to this basin. In the channel of the Cucamonga Springs there is some of the recent formation. Where the springs rise there is a covering,-- a thin covering,-- and in that sense there would be breaks between the two formations. Probably his questions would apply to the two basins in that way. The same thing might be true on the west side, as testified the other day, at the Lady Tunnel and the Picnic Springs where the recent formation was covering the other thinly. There were breaks undoubtedly which caused the Picnic Springs to appear, passing out of the old formation and then into the recent, and to that extent I believe his questions apply to this basin.

Q But that, you think, is below the 16th Street wells?

A Undoubtedly below the 16th Street wells, because the manner in which the strata are folded would itself imply that

the breaks occurred in the apex of the hill instead of at the bottom, where they were folded so as to consolidate the strata instead of opening them. And that is why I want to show by the diagram where the breaks would occur.

Mr. Haskell: (Resuming.) Q I have understood you to state that this ancient alluvium, as you have denominated it, is exposed for a mile or half a mile along the foot hills:

A Yes; it is upturned and exposed in contact with the recent formation.

Q And at that point there is no hermetically sealed division between the two?

A That is my belief, based on the geology of this country.

Q But there is a free passage for water to percolate from the surface of the ground down through to the bottom of the ancient alluvium at that point?

A There is, restricted only by the resistance in the upper alluvium to restrict that percolation downward.

Q And which do you think is the coarser and more porous at that point, the ancient or modern,

A I believe the modern is the more coarse, not only at that point but at every point.

Q Now the average rainfall for the last five years has been how much? 19.29, hasn't it?

A Do you wish me to check those figures?

A I wish you would check that. It won't take but a moment. Assuming that the 1908-09 rainfall was 17 inches, as before.

A How can you assume anything about a season which is not yet closed?

Q Well, up to the present time.

A How much do you estimate that or assume it to be?

A 17 inches. In fact, it is a little more than that, and I will show what it is later.

A On that assumption the mean for the last five years would be 19.29 inches.

Q Now, if I understood you correctly, it is your idea that none of the run-off in the last five years has actually yet reached the 16th Street wells?

A No; I don't think that. I think some of it undoubtedly has. I believe I explained that previously.

Q How much of it?

A I think that would be beyond my ability to estimate.

Q You can't tell?

A I can't tell; no.

Q Some of it has got there?

A Some of undoubtedly has reached there

Q The waters spread at or near the foot hills are what I am speaking of, either artificially or naturally, over this half mile or mile of area which you have figured.

A If you go back as far as five years, I believe some of that water has reached the 16th Street wells.

Q What proportion of it?

A That is impossible for me to state

Q Will you state that any of it that fell four years ago had reached there?

A Well, it is merely a guess; I would say that probably some of it has.

Q Would you say that any of the water that fell and ran

off three years ago had reached there-- that sinks in within a mile of the foot hills?

A There might be a little of that that would sink within a radius of half a mile. It is a hard thing to express an opinion.

Q Would you say that any of the water which fell and sunk two years ago has reached there?

A That is hardly probable, Mr. Haskell, because that would require a velocity of more than a mile per year.

Q Now then, if that is the case, there must be a folded plane there in proximity to the foot hills, much higher than it is lower down, isn't that true?

A Unquestionably.

Q And the folded plane, according to your theory, which will raise the waters when they reach there?

A When they do reach there it will raise it up.

Q That is, you expect its coming and that it will restore things?

A Yes, sir; a part of it has come and partly has restored things.

Q About how high do you expect that that water is above the line of separation between the ancient alluvium and the modern?

A That would be pretty hard to answer. I don't think you could answer it. I don't think it is a continuous touch all times of the year, because after the rainy season I believe that the waters up there are insufficient to fill the downward percolation-- I don't believe that in the dry season there is continuous touch, but at this time there

34 there undoubtedly is, and during the rainy season.

Q About how high do you think that was built up?

A I have no opinion on that. The Frankish & Stone Tunnel throws a little light on the variations by showing the flow of the tunnel, and that is about all the information we have on the subject.

Q Do you think that up in this region close to the foothills the water is in a normal condition at least, if not better than a normal condition, on account of the immense rain fall and run-off?

A I do think up in that region the water is fully normal at this time.

Q And that there is from this point that you have designated and made the extreme limit-- that there is absolute separation between the upper and lower waters?

A Below that point?

Q Yes.

A There is?

Q Now if that is the case, with the head up there in its normal condition and even better than its normal condition, and that being the only source of supply of the Cucamonga Springs and other springs that you enumerate and other wells, why don't they flow better than they ever did?

A Because at that point the Cucamonga Springs supply is not underpressure. It is merely percolating water going toward the vent; and until it is under pressure the head cannot affect the discharge.

Q But you say the head is better than normal.

A I said the elevation and the supply is above normal, but

it is not under pressure.; and whatever head there is there is being exerted in percolation toward the point where the waters are finally divided between the two alluviums.

Q Yes; but you say that up here within a mile or somewhere of the foot hills, owing to the last three or four years heavy rainx fall which are better than the average, that the condition there, not only owing to the rainfall but to your spreading out which has increased the amount which goes into the ancient alluvium, more than it ever was before, and from that point on down that there is an absolute separation. Why is it under those circumstances and conditions that theCucamonga Springs don't flow more than they ever did after you pile so much water into it?

A For the same reason that if you have a flume three miles long, if you pour water into the upper part of the flume you don't get it at the lower end till it has time to flow down there.

Q Yes; but you have said here a numberof times and Mr. Trask has said a number of times that these springs quickly respond to the rain. That as soon as these wells are closed these springs begin to flow more, and that that don't show anything but that it is a coincidence of this rain that comes in there and transmits this quick pressure down through the underlying strata.

A I beg your pardon for saying that you are not quoting me correctly, or Mr. Trask either. We said this: When the rains come they do feed the springs somewhat from the water xxxx falling in the immediate vicinity. But that is all we did say.

Q How the immediate vicinity is the 16th Street wells, is it not?

A No indeed, it is not.

A They are only 3000 feet up the stream.

Q But the immediate vicinity is that right around the Red Hill and that does shed water and helps the springs and all the wells.

Q How large a watershed area is there between the Rubio well and where the springs come out? Figure that out?

A Well, there is a watershed there something like a square mile, possibly more, from the contours on that map.

Q What kind of soil is it there in the major part?

A The hills are clay soil which shed their waters rapidly to the gravels in the channel, and thereby they help the springs.

Q How much rainfall can you get off of that area of ground? How much run-off?

A That is a matter of computation which I have not made; but you get quite a little run-off from that square mile of area.

Q Can you figure out a square mile there?

A I think I could do it if I had sufficient time.

Q I wish you would do that at the noon recess. Figure the run-off and the area.

A I would hardly have time to do it between now and after noon; but if you will wait till Monday morning I will do it.

Q Do it Monday morning. Haven't you stated repeatedly that the water of the springs is from the underlying waters which

are under pressure?

A I have stated repeatedly that the permanent waters are, but I never denied and I have always said repeatedly that after rains and rains the rainy season that the springs are augmented to some extent, and the wells are augmented to some extent, and the Lady Tunnel is augmented to some extent, by the rainfall on the surface of the adjacent territory.

Q And you have compared these ducts that lead to these springs to pipe lines?

A I have, up to a point--

Q In which you say there is a quick transmission of ~~water~~ pressure?

A After the water reaches those ducts there is.

Q Now you say that on this upper half mile or mile where the two strata are together that the water quickly penetrates, don't you, and passes down?

A It may take a year or two to penetrate to the ducts.

Q But you have stated that it will quickly penetrate.

A It penetrates quickly as compared to where the distance is three miles. But that doesn't mean two years or three years.

Q And you have stated that that pressure was attributable almost immediately after a rainfall.

A No, sir; that is not what I said. I would like to see the testimony which says it.

Q Isn't it a fact that in all these artesian conditions that exist in every basin in which you ever made investigations in Southern California, that within a week after

a heavy rain the pressure in every artesian well is increased?

A Now, sir; I know it is not a fact.

Q In what artesian basin isn't it a fact?

Mr. McKinley: Objected to as not cross examination.

The Court: Overruled. Defendants except.

A I don't know of any artesian basin in which it is a fact that after dry years the first heavy rain fall makes it respond immediately. I know is some places it has taken years. The Coastal Plain near Long Beach and the artesian basin at El Monte and also the artesian basin at Santa Maria, take many years to respond after therainfall. We had a water case tried at Santa Barbara on that very matter. And also at San Bernardino after the dry years it took several years here before any improvement was noticed, in spite of the work of the Riverside Water Company in spreading water on the debris cones.

Q Don't you know they began to respond the first wet year, and didn't you so testify.?

Mr. McKinley. Objected to as not crossexamination and on the ground that the testimony is reduced to writing.

The Court: The objection is sustained on the last ground. When you refer to another case you must produce the record.

Q You think then that these waters that have been sinking in the last four years at or near the foot hills have not yet reached the Cucamonga Springs?

A Some of them have, as is shown by the increase in the springs. But I think not enough has reached the Cucamonga

Springs to bring back the large flow. There is enough there to show that the springs flowed on the 7th of April 82 inches when I was there the other evening.

Q Now then, you put into this case a theoretical outlet to the southwest of the Red Hill?

A I did dn't know it was theoretical; I think it was there.

Q To the southwest of the Red Hill?

A Oh. I understood you to the southeast. No; that outlet is not theoretical. It is actual.

Q But it is based on your finding a dry well.

A No; it is based on that and on wells with water in them, and on an exhibit which you produced in the case called Intefnenors' exhibit no. 2.

Q Largely based on the Sourwine well which has always been dry?

A The Sourwine well has not always been dry.

Q Well, there was but little water at the bottom of it, and generally found dry by those who examined it.

A Since the water plane fell it has been found dry.

Q When you were cross examined by Mr. Britt upon exhibit Z-9 your attention was called to the water contour lines 1200 and 1100 running approximately parallel with the Red Hills, east and west of the Red Hills.

A Yes.

Q And you stated because those two lines were close together that they showed a free passage of water.

A Exactly.

Q Now suppose the upper contour line-- 1200-- that along that line there had been erected one of your hermetically sealed dams, we will call it, so that no water could per-

colate through it: It would show the same thing, wouldn't it? It would show a free passage below the dam?

Now the proximity of those two parallel lines shows either one of two things: That there is a dam there at the 1300 foot contour line or somewhere above it.

A. No, it does not, because the contour line 1300 negatives that proposition.

Q. How can you say that the water level from 1200 to 1300 does not approach the 1300 line approximately on the same level as the 1200 foot line until it gets within 300 feet of the 1300 foot line?

A. I am not saying that.

Q. How can you say that it doesn't?

A. I am not saying that anything does. I am saying that the existence of the 1300 foot contour was near the 1200 at the west part and shows that what you say about a dam is not correct. And that is where the influence of the Red Hill is felt. Id there any evidence shown on this contour sheet of any dam?

Q. Now as a matter of fact the Courwine well lies northwesterly quite a distance to the north of the little Red Hill, doesn't it?

A. It lies almost due northwest from the little Red Hill.

Q. And it was how many feet to water and what would the water elevation be above sea level?

A. In 1899 it was 184.7 feet to water and the water elevation was 1176 feet above sea level.

Q. That shows then that it was approximately at the same level as the 1200 foot contour line which you have testified

to be correct according to your own measurements, but still further north than the 1200 foot contour line and close to the 1300 foot contour line?

A I don't think it was close to that. The date on which you take these levels has a good deal of influence.

Q But it shows that it was approximately on the same level?

A On that date. But when you compare wells and contour lines you have to correct it. Taking those dates it was approximately on a level.

Q Then the barrier which holds that water up at the 16th Street wells must be further north than the Sourwine well, mustn't it?

A No, sir; because the experimental shaft no. 4 between there shows that it is not.

Q What did experimental shaft no. 4 show?

A It showed the water plane 1410.5 feet in '90; and if you correct that up to '99 and 1900, it would be 1363.8.

Q What do you call that well?

A Experimental shaft no. 4.

Q In experimental shaft no. 4 the water stood something like 200 feet higher than it did at the Sourwine well a little further to the south. Figure it out. I have just approximated it.

A It was a little over 180 feet higher.

Q What could make that stand up but some quality of the soil that was impervious, or an extension of the Red Hill swinging around that way?

A If you look at Z-9 you will observe that the Red Hill which forms a dam elevating the water plane at 16th Street

wells, and exerts an influence to the westerly, and that the water plane does not begin to fall as rapidly near the 16th Street wells by reason of the proximity of that barrier, and therefore, experimental shaft no. 4 which is nearer to the 16th Street well would not have as rapid a decline as the decline to the Sourwine wells. Another reason, it is plain from exhibit D that experimental shaft no. 4 is more west than south of the 16th Street wells, while the Sourwine well is more south than west, and the contour on Z-9 shows that the greatest fall is between those two points. I see no difficulty in understanding that feature of it.

Q What is the distance between experimental shaft no. 4 and the Sourwine well as depicted on defendants exhibit D, as depicted on the ~~weak~~ exhibit according to the scale?

A Experimental shaft no. 4 is 2600 feet north of the Sourwine well or shaft in section 5, and about 1700 feet west.

Q And what would be approximately the distance from the Sourwine well to the 1100 foot contour line as depicted on this map exhibit Z-9?

A In order to answer that I would have to transfer those contours onto the other map.

Q Can't you state approximately the distance?

A Not without transferring the contours on the other map.

Q I won't wait for it then.

Q As I understand you to say, the close proximity of the 1200 foot and 1100 foot contour lines on defendant's exhibit Z-9 shows a free movement of water.

A They do; they show that the effect of the Red Hills in

restraining the water plane has ceased at that point.

Q That when there is a steep water plane it is free?

A Yes; a steep grade in a stream makes a free movement.

Q Now then, you will notice that higher up here between the 1200 foot line and the 1300 foot line there is a wide space?

A Where?

Q West of the Red Hill.

A It is quite narrow at this point--

Q No, but at this point west of the Red Hill it is quite wide.

A It is a long way west.

Q Therefore, reasoning by analogy, there must be a great obstruction between those two red lines?

A No, sir; because the influence of the Red Hill is still felt at the point you speak of.

Q Why can't you say, if there is no obstructionx where the lines fall together, that there is a great obstruction in the neighborhood of the Sourwine well where they are wide apart?

A I don't say that. I say that the point that you mention is so far north that the effect of the Red Hill is still perceptible there and there is a restraining influence which elevates the water plane, and the water passing around the Red Hills to get to this free outlet is necessarily backed up, and that accounts for the wide space.

Q Wherever water is backed up something restrains it?

A Yes.

Q And where these three lines come closely together,

the 1300, the 1200 and the 1100 foot contours come close to other, there you say there is a free passage; but where it is wide apart above that there must be something to restrain the water.

A Either that or a scarcity of water.

Q A hole in the ground?

A No, not a hole in the ground. There may be scantness of supply.

Q Do you think there is holes in the water plane?

A I didn't say so. I said that the contours, if they spread, it is either the backing up of the water plane or a scantiness of supply. One of those two things must account for it

Q Something has kept this water up at 16th Street wells except when you were pumping?

A Do you want to know what it is that has done it?

Q I say something has done it.

A Certainly. Do you want to know what it is?

Q You have been telling what it is. And you say it has a free passage at the southwest at the same time.

A It has. And if you will produce Intervenors Exhibit 2 I will show you that you said so when you put it in evidence.

Q How can you keep that water there without some substantial barrier?

A Nobody said you could. The Red Hill is the barrier which keeps the water up at the 16th Street wells.

Q If the water plane is kept up does it make any difference whether it is the Red Hill or something else that keeps it up?

A You asked the question and I answered it.

Q I understood you to say in your testimony that some water, and youmestimated it to be 20 inches approximately, comes from Day Canyon to the Red Hill.

A I have the quantity that I testified to.

Q And you say it gets there through underground ducts.

A In the ancient alluvium; yes.

Q And in describing that you laid your ruler on that map and said you thought it came along in about that direction. Isn't that true?

A I said that was the extreme points.

Q Is that where you think it does come through.?

A I think it comes through from that point through the east side of the known artesian formation.

Q Through a duct ?

A Through various ducts. Not through one duct; there are various ducts.

Q How many ducts?

A I didn't mean for a moment that there is a single duct.

Q About how many do you think thereare?

A I don't believe I could tell you the condition of the arrangement of the material under ground in that area. It has not been explored so that it can be stated.

Q Do you think there is a hundred.?

A I think nothing about it. My reasoning is deductive from the processes of nature in building up a formation, and that sort of reasoning does not permit the counting of the ducts.

Q You can't count the ducts?

Q You can't count the ducts?

A No, I cannot..

Q How from this Cucamonga Canyon source do you think there are ducts?

A There are underground ducts for the conduct of underground water to the ancient alluvium.

Q How many?

A I refuse to state, because in deductive reasoning from natural processes one cannot determine the details. One can determine the general rules and arrangement.

Q There are ~~xxxx~~ so many of the ducts that the number of them cannot be counted or estimated?

A So many or so few, whichever way you wish ~~it xx xxx~~ to take it.

Q If there was more than one you~~xx~~ would know where it was?

A There must be more than one because the channels flowed in more than one place.

Q Is the same true in the San Antonio Canyon?

A The same is true in the ancient alluvium.

Q And you have stated that there is a certain number of ducts that come down to the Red Hill?

A I have said so, to the west side.

Q Is it your opinion that these ducts start from Deer Canyon and go in straight lines?

A It is not my opinion that they start, in the first place, from the mouth of the canyon at all, but at some point lower down; and in the second place, it is not my opinion that they go in straight lines.

Q Do they cross eachother in places?

A They might cross above and below eachother

Q Is it the same thing with the Cucamonga Canyon ducts?

A Yes. It may be like your ~~artesian channel~~ hypothetical artesian channel the other day, that they are cut off and are dead ends, and that they hold back the water because they may have been cut off at one end or the other so as to prevent circulation.

Q And is the same thing true of the San Antonio ducts?

A What I have testified as to underground veins or ducts is true of all of them in the same way.

Q And they cross and recross eachother?

A Above and below eachother, and some cross at the same level and break eachother up and make them useless for the carrying of water.

Q And the Cucamonga ducts cross the San Antonio water ducts?

A On the west side they do.

Q And the San Antonio water ducts cross the Cucamonga Canyon ducts?

A They undoubtedly do on the west side.

Q And those ducts that you speak of were nothing more nor less than the beds of the ancient streams coming out of the Cucamonga Canyon, that shifted from side to side? Isn't that true?

A They are those old beds of the ancient streams which had been covered over and silted over with clay and which have since been bended over by the uplift of the Red Hill terrene.

Q. Why don't the San Antonio Canyon ducts cross to the east side?

A. I should think that would be quite obvious from an examination of the map; that after the San Antonio Canyon has migrated so far to the east its trend would be turned southerly by the counter folds of the Cucamonga Canyon, so that it is hardly probable that it would extend to the east. Although, I admit that, the spread of the ducts may extend even to the east.

Q. Haven't you drawn an angle on defendants exhibit P within which you say these ducts from the San Antonio Canyon spread out?

A. Yes; I have drawn an angle of the swing of the stream.

Q. And that angle is drawn far north of the 16th Street wells and the Cucamonga Springs, is it not?

A. It is.

Q. And then, many of these ducts, for aught you know, may point direct to the Cucamonga Springs?

A. They may. I said it was possible. But there is no great probability of their so doing.

Q. In other words, this ancient formation was built up and made up the same as the recent formation has, by a change of the stream from side to side as the debris cone was built up, by bringing down material from the mountains?

A. In that way; yes; it was built up in that way. The difference being mainly in the flatter grade and the lower mountain range and the larger flow of water in the ancient times.

The Court: Do you consider the red clay or the Red Hill

as part of one or the other of these formations, or simply a diaphragm which separates the two formations?

A I don't consider the red clay itself-- the capping of red clay on the surface -- as part of either formation. As I understand the geology of the section, and reasoning from the evidences on the mountains and in the valley, that in the champlain period there was a subsidence of the entire valley and a marked subsidence in the mountain ranges, and those clays were deposited in still water during the subsidence. And that is shown by the high wash gravels which have collected at the shore of the ancient lake and which are now uplifted and found at the mouth of Lytle Creek and San Antonio Canyon and a great many other places in the Sierra Madre range.

Q You consider it part of the diaphragm rather than part of the formation?

A Yes; it is the champlain deposit and is a separation between the two formations.

Mr. Haskell: Then you can't say from any knowledge you have, founded upon any theory you have in regard to the formation of this ancient alluvium, but what some of the underground waters in the ancient alluvium from Deer Canyon crossed over into the ducts that lead from Cucamonga Vanyon and from there across into the ducts that lead from San Antonio Canyon?

A I can only say this in reply to that question: That if two of these channels should at some time meet in forming the ducts, they would from that point become one stream, and that that stream might take a very different course, de-

pending on the relative amount of water in the two streams which met; and your assumption therefore would not be carried out because Cucamonga Canyon being the larger watershed the probability is it would overpower the flow from the smaller one and still maintain the direction towards the east.

Q. But the Deer Canyon has the higher head.

A. You don't know whether the head was higher in the olden days.. We are speaking of the ancient alluvium laid down on the flat valley.

Q. It is evidence you can't tell, according to your theory,-- you can't separate those propositions.

A. You could say the chances are about 999 out of 1000 that your proposition would be wrong and mine would be right.

Q. What is your proposition? That they don't mingle?

A. That they do mingle and that after they mingle the larger stream continues in the direction it was flowing and turns ~~xxxxxxxxxxxxxxxxxx~~ the other smaller stream in the same direction.

Here the Court takes a recess until two o'clock p.m.

---oOo---

After oon Session 2 p.m.

Cross Examination of F. C. Finkle, resumed.

Mr Haskell: Will you read the last question and answer?

(Last question and answer read by reporter)

Mr Haskell, Q Do you mean precisely that on reflection?

A That is, that a large river, receiving a small tributary, is not turned by the small tributary, but continues practically in the same direction.

Q I thought you said all these things were under a head, under pressure.

A They were not at the time the deposit was laid down.

Q I am not talking about deposit laid down; we were talking about the effect at the present time.

A Well, I misunderstood you entirely; I was under the impression when we were discussing the formation in these veins, we were talking about the time they were being laid down.

Q Well, now in reference to the present moment, what is the effect?

A What is your question in regard to the present moment?

Q I will put a new question so there will not be any misunderstanding. Is there anything in your theory promulgated in this case, by which you can distinguish whether the water at any given point comes from a duct leading from Day Canyon, or from Cucamonga Canyon, or the San Antonio Canyon?

A There is sufficient information in the case so that that matter can be determined to a certain degree; I don't believe there is enough information to determine precisely where every drop of water comes from which emerges at a given

point.

Q So that for aught you know, the wells that feed the Sadie tunnel may be supplied from the Day Canyon, or from the Cucamonga Canyon, or from the San Antonio Canyon, or partly from all three combined?

A No, I don't agree to that; in fact I very positively assert that that proposition is not true, as to the wells in the Sadie tunnel.

Q Is that all?

A That is my answer.

Q Upon what do you assert it?

A I assert that upon the knowledge of the manner in which fluviatile currents have constructed the formation through which these waters are moving.

Q What is that knowledge?

A That knowledge is the geological knowledge which one acquires by study and observation and experience, in relation to geology and hydraulics.

Q Then will you tell us the line of demarcation?

A The line of demarcation between the Sadie tunnel waters and those on the east side, is through the large summit of the Red Hill which prominently protrudes above the surface.

Q Will you draw a line upon Defendants' Exhibit F showing the line of demarcation of the ducts that lead from the San Antonio Canyon, towards the Red Hill from those of the Cucamonga Canyon that lead towards the Red Hill?

A That line of demarcation is not a line but an area, and you cannot draw a line to represent it.

Q Will you define the area?

[illegible]

Q. Because the people, you know, can only look [illegible] [illegible] [illegible]

A I can define the area approximately within which that condition prevails: If you will observe on the Defendants' Exhibit P a red line, which is drawn from the mouth of San Antonio Canyon, and which has an angle of 117° 30' with another red line drawn to the southwest from the mouth of that canyon, you will see the extreme northern limit, to which the waters of the San Antonio Canyon have ever, in all probability, traveled, in building up the ancient alluvium; and you will see that the Cucamonga Canyon, by a similar representation, shows a red line which runs to the east at a much further northerly direction. Now, the head required to force water out of the Red Hill formation, begins at a point much further north, or some further north, than the red line from the San Antonio Canyon extends to the north; and therefore the presumption is that little, if any, water from the San Antonio Canyon can pass on through to the east side; another reason influencing that is the force of the Cucamonga watershed, which would tend to deflect whatever side currents flow to the very extreme point of the debris cone of the San Antonio Canyon; these forces together would in my judgment be sufficient to confine nearly all waters from the San Antonio Canyon to the west side of the Red Hill, and if there be any veins from San Antonio Canyon extending as far east as the east side of the Red Hill, these would pass under the recent gravels, and through an area which is north of the 16th street wells, and would not pass through the Lodie tunnel development or the alluviums which supply that; and therefore as I said before, the separation is the Red Hill area projecting to a high elevation between

the east and west side, through which no large deposits or strata have been deposited, making it possible for any appreciable quantity of water from San Antonio Canyon to reach the east side. Now in making this answer I want to be understood as saying that there is a possibility of there being a small insignificant vein somewhere on the northern limit which might traverse to the east side and supply the east side; if so it would pass north of the Red Hill.

Q Now it seems to me that your answer has a good deal wider angle of divergence from my question than those red lines have from the canyon; but, however, to return to the proposition, you have marked and designated by these red lines a large area of country coming from these three canyons fed by supposed ducts running through that area, and for half or three quarters of a mile north of the 16th street wells; and from your lines drawn on this Defendants' Exhibit P the ducts from any one of those three canyons may cross the same area: , Is that not true?

A Yes, sir; but they may not cross the Radie tunnel, and the Cucamonga Springs, from the San Antonio Canyon; that was the proposition to which you first referred.

Q They may not.

A They cannot.

Q They may not - But is there anything in the theory which you have promulgated here of ducts running from these three distinct canyons, that would prevent any particular duct from any particular canyon reaching the Radie tunnel? I am not now speaking of the canyon furthest east, only including

in the question the Deer Canyon, the Cucamonga Canyon and the San Antonio Canyon.

Q In other words, you limit your question to Deer Canyon Cucamonga Canyon and San Antonio Canyon?

Q Yes, sir.

A Relative to that I wish to state that any duct which would pass from Deer Canyon in the manner in which I have laid this pointer on the map, Exhibit F, could not pass through the water supplies which supply the Eadie tunnel or any duct passing east of that point from Deer Canyon, and I wish to mark that - -

Mr Goodcell: When you refer to the position in which you lay your pointer please mark it.

A I was proceeding to mark it on the map so that it could be preserved in the record: I now mark that with yellow pencil, and designate the line AB at the two extremities; what I mean to be understood as saying is that ducts which x are laid down east of that point or to the southeast of that line, could not supply any of the watersupplies in the Eadie Tunnel; that applies to Deer Canyon.

Now, if we take Cucamonga Canyon, I will draw a green pencil line, and mark that CD on the same map, and would say that any duct in the ancient alluvium, which has been formed to the northeast of that line could not pass in such a way as to supply water to the Eadie tunnel; that refers to Cucamonga Canyon.

I now mark again on the same exhibit F, a blue line, and would say that any duct which is laid to the northeast of that blue line marked EF at its two extremities, could not

on the supplies for Deer Lodge, the Gunnison Cayuse and the Salmon Cayuse.

Q. In other words, you think your quarrels in Deer Lodge Gunnison Cayuse and the Salmon Cayuse

A. Yes, sir.

Q. Definitely in that I wish to state that any foul play which came from Deer Lodge in the matter is which I say. Take this pipeline on the map, Exhibit F, would not have through the water supplies which supply the Butte Mount or any that passing west of Anaconda from Deer Lodge, and I think he would tell.

Mr. Bancroft: Then you refer to the pipeline in which you say from polluted place that is.

A. I was prevailing to make it so the map so that it would be presented in the review: I saw your look with pitiful pencil, and delegate the time AB at the by authorities; what I mean to be understood as saying is that Butte which are this here week of high-grade or in the neighborhood of that line, would not supply any of the waterworks in the Butte Tunnel; that applies to Deer Cayuse.

Q. Yes, Other than Gunnison Cayuse, I will have a green pencil line, but only that AB as the same map, and would my high-grade line in the contract alleging, which was been free- ze in the neighborhood of that line would not pass in even a day as to supply water in the Butte tunnel; that refers to Gunnison Cayuse.

I now ask leave to the note marked F, a line line, and would my that was not what is held by the municipal of Butte line marked AB on the pipe-railing, which was

supply the Kadie tunnel with water; that I believe answers your question.

Q Well, we see a little later on whether it does or not when we return to it; but before we approach that subject again, it is a fact is it not that all of these areas which you have mentioned coincide in part, so that water ducts from the San Antonio Canyon, ducts from the Cucamonga Canyon and ducts from the Deer canyon, could any one or all of them, as far as you know, feed the Cucamonga Springs?

A As I think you would easily infer from my last reply to your former question all portions which lie to the southeast of the yellow line, or practically all portions, might feed the Cucamonga Springs, and practically all portions which lie to the northeast of the green line might feed the Cucamonga Springs, and practically all portions, not quite, which lie northeast of the blue line might feed the Cucamonga Springs; but no portion of any of those arcs or debris cones which lie on the opposite sides of those various lines could feed the Cucamonga Springs.

Q Now, proceeding again in reference to the Kadie tunnel, within the lines which you have drawn is it not possible for ducts from Deer Canyon, ducts from Cucamonga Canyon, and ducts from San Antonio Canyon, to mutually supply the water that runs into the Kadie tunnel?

A That is possible, if you confine it to the northwest side of the line AB, to the southwest side of the green line CD and to the southwest side of the ~~grne~~ blue line EF, from Deer Canyon, Cucamonga Canyon, and San Antonio Canyon, in the order in which I have referred to the various lines.

Surely the Bible teaches this doctrine, but I believe somewhere else perhaps.

Well, we can a little later on consider it from every-one when we return to it; and before we conclude that subject again, it is a fact in it and line all of those things that are distinctive principle in part, so that whether that from the Bible teaches, that from the Christian Church and divide from the first centuries, which are so well of them as far as you know, that the Christian Religion.

Now I asked you which really later from my last study in your Church question all questions which lie in the work-shop of the public time, or practically all questions, which that the Christian Church, and practically all questions which lie in the workshop of the great line which that Christian Religion, and practically all questions, and practically all questions, which lie workshop of the line which from the Christian Religion; but we question of any of those were in doubt, every which lie on the opposite side of those questions that really that Christian Religion.

Now, practically again in reference to the Bible Canon, with the line which another from it is not practically the Bible. That line Church, that the Christian Religion, and that from the Reformation. It actually moving the which that from the Bible Canon?

Now that is possible, if you realize it is the workshop side of the line at, is the workshop side of the from line that is the workshop side of the same line IV, from Church Religion, Church the Church, but the authentic Church; in order to which I have referred to the written Bible.

Q Now, you have referred to an area of country at the mouth of each of these canyons that has been so denuded of the ancient alluvium that the porosity of the recent alluvium lays on the porous ancient alluvium so that there is no separation: About how far down from the mouth of Deer Canyon do you think that extends?

A I am unable to state how far down that does extend; and I also wish to correct your impression in one other regard, in that I did not ascribe that condition of contiguity or intermingling to the act of denudation; I ascribed that principally to the upturning of the ends of the older formation at the foot hills, when the main mountain range received its last uplift; and it is also likely that the denudation may have played a part in the proposition, right where the streams debouch from the various canyons, but between them I don't think it did.

Q Before we get to that issue, you have stated here that this area of deoris cone which feeds the ancient alluvium at the mouth of these canyons comes down from half a mile to a mile below the mouth of the canyon: Now, I would like to have you mark on this map, at the mouth of this Deer Canyon, the point furthest south of such condition.

A I cannot give that I regret, with any degree of definiteness, as I have stated in my previous testimony it is so dependent on the thickness of the ancient alluvium, and there have been no borings which penetrate through the ancient alluvium; I have merely assumed that the ancient alluvium on that angle will have a thickness of a mile, but that would be probably the extreme thickness of that alluvium.

Q I don't desire you to fix the point definitely or approx - approximately, but I do desire you to mark it upon this Exhibit F so that the Court will know and we will know what you consider to be a mile from the mouth of that canyon.

A I think thescale of that map tells that; it would vary at every point along the foothills.

Q I would like to have it marked; I am unable to tell myself what the point would be.

A I have stated the maximum point would be a mile, and the probable minimum as half a mile. In other words that the ancient alluviums, or ancient quaternary as I have designated them at that point probably vary between those limits on the angle at which they are upturned; to mark that would require the tracing of an irregular line, and a great deal of time; if you wish me to do it I will take the time to do it; it will be one continuous line because it will follow the foot of the mountains.

A Very well; I would like to see that line on the map and that will solve some problems that I won't have to ask you about.

A I have marked on Defendants' Exhibit F an irregular broken red line which follows approximately one mile from the foot of the mountains, and may be considered as approximately what I would call the probable limits to which the ancient alluvium is exposed without any covering of the Champlain deposit, and through which limit it receives its water supply from the various canyons and foothills. Now, Mr Haskell asked about the other probable limit, which would ofcourse

be inside of this one, and half way between the foot of the mountains and the one which I have marked; the red line to which I refer is shown and lettered GH at the two extremities, being an irregular dotted line in red pencil, shown on Defendants' Exhibit P.

Q Now, I understood you to say this morning that this vast body of runoff that has been feeding the Cucamonga Water Plane in the last nine years, and also in the last four years, has in all probability passed the line of demarcation on its way south, which you have marked GH on defendants' Exhibit P : Is that true?

A I don't remember as that matter was referred to in that way; but I will state now what I have to say on that subject, as I was not referring to the line GH it not having been drawn.

Q You did not say GH but you said the line of separation.

A Well, whatever I said is in the record, but I wish to state with reference to the line GH as follows: that, referring to the first part of the question. the nine years, I unquestionably think that a part of that water has passed below the line which is the line of separation; referring to the last five years, if that was the time mentioned in the question - -

Q I said four.

A Well, four years then.

Q You may make it five; that will be satisfactory to me.

A Well, make it four, as that was in the question,-- And I would state that probably a small part of that, or possibly even a fair part of it,-I woulen't want to be under-

stood as stating any proportions - but what has fallen in the last two years, I doubt if any of it has yet passed that point; that is, confining myself to the waters which have been sinking at the foothills.

The Court, Q By that point, you mean the point indicated by the Red line?

A Yes, sir.

Q You mean GH as indicated on Defendant's Exhibit F?

A Yes, sir. That does not mean water which has been sinking near the line GH or below it, but water sinking above that and near the foothills.

Q I notice in this line GH on Exhibit F you have certain irregularities, indentations and so on; I am curious to know on what principle you have laid that line down; ~~it~~ is it according to the contour or distance from the main range of mountains or what?

A It is intended to be laid down on the principle of being about equally distant from the foothill or main range of the mountains; the supposition or theory in geology being that when the ancient alluviums were uplifted - -

Q The line as you have drawn it would practically follow the contour line?

A Not the contour because that would refer to the level line along the foothills and mountains, while that may be modified by erosions of the washes. Hardly that, because the erosion would only deepen the amount of recent material which is covered over the ends of the ancient strata.

Q You say it follows not the countour line, but the foot of themountains: Are not the foot of the mountains indicative

of the contour line?

A Not exactly; for instance you take the contour line 2000 and that at some points leaves the mountains, and at other points it is up in the mountains; in other words the foot of the mountains is not at the same elevation throughout but it varies.

Q But taking the general courseof the range?

A Yes, sir; I wish to say that that line is only the merest approximation, as no one could lay off that kind of a line without making a geological survey.

Q I understand you to say that is indefinite or approximate.

A Yes, sir; because it would require a geological survey and borings to locate that line with any sort of accuracy.

Mr Haskell: We understand it is a mere approximation of what the witness considersx the line.

Mr Haskell, Q Now, I understand you to say that the run-off of the last two years has not passed the line GH?

A I would not expect any runoff, which has been sinking in the foothills or up in the canyons in the last two years, would have yet passed that line.

Q Now, if it has not passed that line, is it probable or improbable that the contour line of the waterplane above GH is higher than the crest of the ancient alluvium on that line?

A Well, thereis no waterplane at that point, in the sense in which you use that word.

Q There is two years water coming there.

A It is water filtering through the soil; waterplane means a saturated mass; I do not understand there is such a thing

of the engineer-line?

A. Not exactly; for instance you mean the engineer line that was laid at some points across the countries, and it allows infants to go in the conditions; in which cases the time of the conditions is not so the same alternative transmission and in cities.

Q. Not taking the general measure for cables?

A. Yes, sir; I mean to say that such line is only the general circumstances, so as we could say at least that the line without having a religious meaning.

Q. I understand you to say that is beneficial or appropriate.

A. Yes, sir; because it seems results a peculiarly strong impression in Jewish that line will not meet of monotony.

Q. Basically: by conversion it is a [illegible] of work the signal-converter the line.

Q. Basically, I mean, I understand you to say that the transfer of the line for years has not passed the line [illegible]

A. I would not support the [illegible], what are some existing in the instability or so in the response in the [illegible] would have yet passed that line.

Q. Now, if it has not passed that line, is it possible or appropriate [illegible] the [illegible] line where is lighter than the [illegible] allowing so that line?

A. Well, there is no [illegible] at [illegible], in the same in which you see that work.

Q. There is not [illegible] line.

A. It is [illegible] the [illegible]; [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

in that vicinity.

Q There is water there?

A Yes, there is a medium of transmission through the soil, but it is not saturated; thereis not sufficient water to saturate it.

Q Well, fix that term just as you want it, call it what name you wantto call that water by: that rests in that porous material above the line GH?

A It does not rest there; it is in slow motion through there; there is not enough water to saturate the voids, and therefore I don't call it a waterplane or a saturated mass.

The Court, Q Do you mean that it is not in contact at all points?

A No, I don't think it is contact at all points; the borings made in numerous places along the foothills have shown that fact.

Mr Haskell, Q Do you think the surface of that water is higher than the ancient alluvium, than the contour line of the ancient alluvium along the line GH?

A That water has no surface; that is water which is finding its way downward on a slanting angle towards the definite water plane, and has not yet assumed a surface.

Q And you think that that water is under pressure or not?

A Not under pressure

Q How can it move?

A By force of gravity.

Q It is under the pressure of gravity then?

A No, it is under the pull of gravity; not under the pressure of gravity.

Q Do you think that the water in that mass has no pitch?

A I think it has a pitch wherever it exists.

Q Do you think that pitch tends to accellerate the motion of the water you find in it or not?

A I think it does; that is what makes it move.

Q And do you think it is or is not in contact with the water you find back of it, at the line GH?

A I know it is not in contact.

Q How do you know it?

A Because there is not sufficient water to saturate that mass, and the water is widely scattered, as we have shown by sinking wells and shafts in many places along the foothills.

Q You think the water of the last two years is all above that point?

A That which has been sinking near the foothills is.

Q Then the water which preceded it for the previous three years, is that in front of it or behind it?

A Well, it is undoubtedly further advanced in the trend of its travel than the water which came later; but the two are not in contact, because there is not sufficient water to fill those vast strata in those debris cones.

Q Taking the last nine years when there was an excess of rainfall above the average,- how much of that nine years runoff has passed the line GH?

A I am afraid that problem is beyond my ability to solve; I have no means of segregating or stating how much of that; I know that some of it must have, within the limits of reason; how much has or how much has not I would not state; it may

be that some of it has already passed down to the springs and developments; I think from the early part of those nine years the indications are that it has, because the developments and springs have increased in flow very materially during that period of heavy rainfall.

Q What is the distance from the 16th street wells directly north to the line GH, as shown on Defendants' Exhibit P according to the scale of that map?

A That seems to be about one and three-quarters miles.

Q Then there must be about seven years of runoff, according to your theory is there not on its way south between the line GH and the 16th street wells?

A Well, I don't think I can commit myself to any number of years of runoff, that are on the way; but I know there is a good deal on the way, from the fact that although 1908 was a low year in that vicinity that the developments have risen heavily, showing that there is water from previous better years on the way to supply these developments.

Q But you have told us here, that our runoff, feeding this Cucamonga waterplane of over 900 inches, and you have said that the reason that the waterplane did not raise to its normal level at the 16th street wells, that that runoff had not yet reached that point: Now, where is it, on the way?

A Now, Mr Haskell, I have no doubt but what you have meant to state correctly what I said; but I wish to say that what I said was that a portion of that runoff had reached the 16th street wells and had very much raised the water-plane, and that the remainder is on the way to reach it, and will in the future still more raise that waterplane; and that a

portion of that water has reached the Cucamonga Springs, and increased the flow from the low flow of some four inches to nearly 83 inches.

Q What measurement do you refer to?

A To a measurement which I made on the 7th of April, to which I have not yet testified.

Q On the 7th of April when?

A This month; I was out the other evening with Mr Trask and made a measurement.

Q Well, it is not in evidence yet?

A Not except as I testified to it this morning in reply to one of your questions; and further in regard to your statement about 900 inches, I wish to correct you on the figure, that it was the natural supply which I stated was 704 inches, and that with the artificial additions of the San Antonio Water Company, that would be brought up to 916 inches.

Q Well, we understand each other.

A That would apply only to the four years which are cov-. ered by the San Antonio Water Company's operations, not to the whole nine years.

Q That is the 915?

A The 916 applies only to the four years past.

Q But the 700 applies to the entire period?

A The entire period; I simply wish to draw that distinction in my reply so that the matter might be plain.

Q Well, now that is all right. But this 700 in the nine year period was more than the normal was it not, according to the rainfall, taking the rainfall as the criterion?

A It would seem to be very slightly in excess of the normal; in other words you figured out this morning - -

Q That in the nine year period to which I have referred there was a greater runoff than in the normal, the 700?

A I did not complete my answer to the former question, Mr Haskell.

Q Well, I withdraw the question. Is not the runoff for the last nine years, less or greater than the average, according to the rainfall?

A According to the figures which you gave me this morning, assuming a certain figure for the season of 1908-1909, the rainfall at San Bernardino was a fraction of an inch in excess of the mean, and therefore to a slight extent the natural supply for the last nine years would be somewhat in excess of the mean, but the exact amount I am not undertaking to state.

Q We will depart from that and return to another statement that you made incidentally a few moments ago: I understood you to state that one of the reasons why you did not think water passing through these ducts in the ancient alluvium from the San Antonio Canyon would reach the Cucamonga Springs was because the elevation was not sufficient.

A I don't remember stating that.

Q Well, why can it not then?

A I stated that some of it might reach the springs, but I doubt very much if any appreciable quantity would reach there owing to the fact that so little of the arc from San Antonio Canyon is tributary to the Cucamonga Springs, and also because of the distance being great, and the Cucamonga Canyon

A. It would seem to be very difficult to reduce it to
writing; he never wrote its figures and this worries me.
Just in the other part period in which I have referred
there was a greater result than in the second, the fact
A. I did not complete my answer to the Tarnac question,
or doubtful.

Well, I mislaid the pamphlet. In one the result for
the last nine years, then or greater than the average,
according to the reliability

A. Answer, it contained relying the part to this question,
consider a certain figure for the period of 1910-1920, the
reliability of the determination was a fraction of an inch in
excess of the mean, and therefore in a slight excess the
natural supply for the last nine years could be assumed to
appear at the mean, or in the exact second, in our operation-
ing in state.

Q. Do you not depart from that and return to another statement
that you made initially a few minutes ago: I remembered
you to state that one of the reasons why you did not take
water pending repairs there could be in the region flooded
from the the adjacent Tarnac would result the Commission
was keeping the situation the and difficulties.

Q. Is your's remarks clearly live.

A. Well, why was it not timed

A. I mean, the time of it only years the service, but I
think they such of the appreciable quantity which seem more
active in the fact that in 1910 if the are lives the natural
course in hydrology in the Commission Service, and also be-
cause of the distance below ground, and the Commission figure

having come down and interfered with the building up of those ducts in the age when those veins were laid down.

Q As I understand, your theory of the formation of the Cucamonga plain in a geological sense was that the mountains sometime existed at about half the elevation they are now, and at that time there was no uplift or fold as shown on defendant's Exhibit Q.

A Well, I think you have confounded my testimony slightly with Mr Trask's; I stated in mine, that I believed there was a fault along there, which had made some uplift before that period, because the evidence of geological activity in this region is, that these mountains first appeared in the latter part of the tertiary age, and unquestionably when they appeared they made a fault or fracture somewhat along the general course of the present Red Hill, and I think all subsequent movements have been along that same line, and I believe that there was something of a fold at that time of older rock in that vicinity.

Q Then when this mountain was at approximately half its present altitude we had what we call the Champlain period, or period of great rains and storms?

A You are confusing the periods; the first period after the uplift of these mountains in the late tertiary was the pleiostecene.

Q You think the ancient alluvium was brought down in the Champlain period do you not?

A No, sir; I don't think any of the ancient alluvium was brought down in the Champlain period; what I have called the

[illegible] [illegible] [illegible] [

early quaternary , and what Mr Trask and Mr Mendenhall have called the ancient alluvium was brought down in the pleiostecine or the first period of the quaternary; I think that Mr Mendenhall and Mr Trask have grouped the two periods, the pleiostecene and the Champlain in one classification, the whole thing as ancient alluvium; I have separated them into their two subdivisions.

Q Do you think there was a debris cone at the mouth of those canyons at that time?

A Do you mean in the early quaternary?

Q Before the Champlain period?

A Yes, I think there was.

Q As depicted on this Exhibit Q, approximately?

A Which section?

Q Section B?

A I believe that there was a debris cone forming during that period as depicted there, with the exception that there was a deeper fill in the middle of that section, or below the words "Sec.B" than depicted on the diagram; and that there was a fold or fault line, already in existence, at the extreme left hand part of the figure.

The Court, Q I suppose the fold would determine the depth of the fill?

A The fold would determine the depth of the fill; when the mountain range was first brought up by pressure that old fault or fold which exists where the Red Hills are, was brought up originally, and I think it has existed since and I think that all differential movements have ~~xxxxxx~~ taken place along that fault line.

Mr Haskell, Q You also think there was a similar debris cone at the mouth of Deer, Day and San Antonio Canyons?

A I think all of the canyons were forming debris cones similar to the present ones, except that they were of finer material.

Q And you think that the streams coming out of those mountains shifted from side to side, do you not?

A I think they did shift from side to side in very much the same arc.

Q And along that line of shift you think they formed these ducts that you have spoken of?

A I think they did so by reason of the varying precipitation, and also, possibly, the varying movement of uplift, as I believe the uplift was in progress during the formation of this material to a greater or less extent.

Q And as these streams shifted from side to side these channels crossed and recrossed each other did they not?

A At times no doubt they did.

Q Well, then you come to that process - You come to the Champlain period,- then what happens?

A In the Champlain period there was a universal subsidence of the American Continent, at which time Lake Champlain covered the Hudson Valley and a great part of the State of New York, and the valley we are in was depressed so that it was a fresh-water lake, and the San Joaquin Valley in California was depressed below sea-level.

The Court, Q There was a time then when there was water enough for everybody in California?

A I judge there must have been at that time.

Mr Haskell, Q What time did this formation sink beneath the sea?

A That was at the close of the early quaternary or the period called the glacial period or pleistocene, and that is what is given as the cause of the melting of the northern glacier, is the subsidence which moderated the climate.

Q Was that an arm of the sea, or part of the main shore line, the Cucamonga region?

A Undoubtedly the Cucamonga region was not an arm of the sea, because we find no marine deposits there; while the deposits correspond in age, there are no marine deposits there; they are fresh-water deposits.

Q Where do you think the shore was?

A I think the coast range or some debris cone blocked the entrance, so that the whole valley was a fresh water lake the same as the San Joaquin Valley.

Q I understood you on your direct examination to say that this Cucamonga plain had been buried beneath the sea.

A I don't think it has been buried below the sea since the latter part of the tertiary period.

The Court: I think the witness referred to a fresh water sea or lake; that was my understanding of his testimony.

Q How deep do you think the water was there?

A That I can only judge by measurements of the Champlain gravels, which are found at elevations of many thousands of feet above the present plain, and deducting the present elevation above sea-level, and allowing for the recent fill it was probably a very deep lake; it was not a sea, unless you call it, being of fresh water, an inland sea.

Q You said in the Barton case that the floor of the San Bernardino Valley was formed under the sea-level?

Mr McKinley: Objected to on the ground that it is calling for statements, the statements not being shown.

The Court: Sustained.

Mr Haskell: Well, we will dig them up.

Q When this valley was a fresh water lake, these streams still came down with a lot of mud into the lake, and the mud floated out in there, and settled down, and sealed this thing up, did it?

A That describes it in a popular way, except that the coarse gravels were deposited on the shores, which constitute the auriferous gravels of this part of the State, and the fine sediments and particles of silt which were light enough to float would float out and settled on the bottom, forming a dense blanket of clay.

Q A dense blanket of pure clay with no gravel in it?

A I don't think you will find any pure clay in this part of the valley anywhere, and I don't think you would find it in that locality.

Q If it was deposited in a lake condition, in order to float in the water it had to be pure, the sand and the gravel would all drop on the edge, in the form of what do you call it?- it leaves the gravel on the shore?

A Yes; but you must remember that pure clay would mean something in the nature of fullers' earth or of that consistency. What I mean to say is that all the light fine particles, whether mica or any of those other light substances from the disintegration of the rocks or sea-muds, which were then

Q: The only in the station have that the Tower of the Gods.

Momentum: Flying was Fiona under the moo-level!

Q: Definitely: Objected to on the ground that it is

melting Ted absurdity, the astronomical being means.

The Court: Sustained.

Q: Thanks!: Well, we will dig down.

A: When this reality was a free motor side, Dave stepped

still-made down with a lot of mechanic the Jade, and he

was flowed out to Dave, and melted down, and sewed this

hidden up, also in!

A: That description is in a popular way, simply that the

source jewels were imprisoned in the marble, which resembl-

ed the multicolored crystals of this part of the State, and

the fine mechanic and particles of gold which were high-

ly to final moon Chest and Metal on the matter,

forming a dense Chamber of Ring.

Q: A-Dave Tunnel or more sing-with be Quartz in it?

A: I don't think you will find any more risk to take part

of the valley explore, and I don't think you would find

in be that heavily.

Q: If it was deposited in a Jade condition, in order to

Dave in the water is not to be done, the mass and the ground

would fall down on the mass, in the form of what is you call

lit- It leave the ground on the shower.

Q: They: but you just remember that your day would come com-

ing in the motion of Fiona' mass to of that consistency.

That I mean to say is that all the Jade Tree particles, the-

ser mine so day of those mine light mechanism. Find the

disintegration of the rocks or mechanic, which were Dave

extensively covering the mountains, all of those particles would move out in the still water and would sink?

Q Yes, those fine particles would sink. How do you think the crust was, formed in that way?

A That is impossible to state, as to the depth of that; we don't know the depth of any of those - -

Q You never have seen it anywhere?

A We see the remnants of it on the Red Hill, and I have seen the remnants of it in the Eadie tunnel.

Q Where did you ever on the Red Hill, see the evidences of any deposit, and no sand or gravel in it?

A We don't expect to see that on the surface, where the waters have carried away the fine materials in late periods and left the coarser, but you do find a large amount of those finer silts, mingled with coarse material, which have blown in and floated in, and washed in by the waves of the water, and the denudation of the Red Hill terrene has undoubtedly left the coarsest part of that whole material on the surface.

Q But where is the testimony in this case that shows anything about a clay strata that is not mingled with sand and gravel?

A Well, Mr Stowell gave testimony in this case, the same he did in the MacPherson case, and I have given testimony, as to the fine silt strata, dipping to the north, which were found in the Eadie tunnel, and in which there was no gravel or stone.

Q Where is that testimony to be found to that effect?

A In the transcript.

substantially covering the mountains, all of these particles would move and in the still water and would sink.

Q. Yes, these like particles would sink. Now do you think the crust was, formed in that way?

A. That is impossible to state, as to the depth of that; we don't know the depth of any of these - -

Q. Can water burn when it expands?

A. No one has examined it in the red hot kill, and I have seen the presence of it in the Delta tunnel.

Q. Have did you exit in the red kill, nor the existence of any deposit, and no mud or gravel in it?

A. We don't expect to see lumps on the surface, where the waters have varied over the flow materials in lake periods and left the deposit, but you do find a large amount of fine fluor silts, mingled with coarse material, which has been in and flushed on, and moved in by the waves of the water, and the formations of the red kill between. Low undoubtedly it left the unassorted part of this whole material on the mountains.

Q. Not where in the testimony in this case that there exists lying above a layer which that is not mingled with sand and gravel?

A. Yes, Dr Stevens, gave testimony in this case, the same he did in the Lagrange case, and I have given testimony, as to the fine silt strata, dipping to the south, which were found in the Delta tunnel, and in which there was no gravel or stone.

Q. Where in that testimony is he found to that effect?

A. In the transcript.

Q Hasn't Mr Trask invariably testified here that there was no clay found there that was not mixed with sand and gravel Mr McKinley: Objected to as immaterial and incompetent, and not proper cross examination.

The Court: Sustained.

Q Don't you know that it is a fact that there never has been a shovel-full of clay found in or about the Cucamonga plains either on top or down underneath, that was not mingled with sand and gravel?

A I know that is not a fact; I know that I have seen myself in the Radio tunnel a thick stratum of clay and silt in which there was no gravel; however, Mr Haskell, I am quite certain that there is more or less coarse material and gravel intermingled with many of those lake bottom clays the same as of this time; the waves and currents in a large body of water transport particles of a certain size, the same as on the sea bottom we find in sea deposits conglomerates, 100 miles from shore, carrying gravels or sands, where the waves have gradually transported these particles of more or less coarseness further and further into the sea.

Q Do you mean to say that it was ever known in geology that gravel was carried out into the middle of a lake, or ten miles from the shore of any sea, by any current of water?

A Yes, sir; I can show you evidence right in the Coast Range conglomerates, laid down in the tertiary age, marine deposits were carried over ten miles to sea.

Q Weren't they carried there when that particular spot was the shore, and when the river was carrying that material there to meet the sea?

A No, sir; a good many of those conglomerates which existed in the tertiary age, have been carried out by wave action on the sea bottom when the sea was not too deep; others have been carried by the currents of the sea; nothing remarkable about that whatever.

Q Did you ever know of any instance where gravel was carried out into the middle of a lake?

A I have.

Q Where?

A You can see that on the smaller lakes in almost any locality.

Q Where?

A Well, you can take Lake Elsinore as an example.

Q Lake Elsinore has been dry within the memory of man hasn't it?

A Other lakes may havebeen dry equally - -

Q And when the flow went to it, it would be at the lowest point.

A Other lakes may also have been dry within the memory of man, and without the memory of man.

Q I believe you told me this morning that you didn't give certain testimony in the case of Newport against the Temescal Water Company, brought in Riverside County?

A I don't remember replying to any question about it; I think the question was ruled out.

I think I did reply to part of it, about the cone of depression affecting the water-plane.

Q Now, I will ask you, if you did not make and give the following testimony in the case entitled Newport and others

against the Temescal Water Company, tried in Riverside before Judge Noyes, in the Superior Court of that County, and I will read, beginning on page 1107 of the transcript , page 9:

"Q What is the rate of percolation through that valley according to your estimation, supposing the water from Newport's wells wanted to percolate toward the Temescal wells, what would be the rate of percolation?

A Do you mean how long it would take for that identical water - -

Q What is the rate of percolation?

A That is the point; the rate of percolation is variable; It may run from ten feet to two feet a day, even an inch or two a day in places; it depends on the formation.

Q How many years would it take to percolate from the Newport wells to the Temescal wells?

A You mean an identical atom of water?

Q Yes, sir.

A That is not the way that water travels. When you release some of this water, you take off that well - you start the water in motion, and that water would keep on filling those voids by a rapid transmission, until it would be affected within a short time, a week or two weeks depending on the resistance.

Q If there was no water behind the Newport wells?

A If there was no water dropping in to take the place of the voids.

Q You can't suppose that is the limit of supply?

A No, sir; nor is that the limit of your interference.

Q There is water behind the Newport wells as well as in

applied the Immoral Water Company, acted as directors be-
fore Judge Hayes, in the objective Court of this County, and
I will then, beginning on page 1247 of the transcript, pick up
the: What is the rule of personalities through that testing
according to your evidence, supplying the water from
Immoral's wells needed to provide towards the Immoral-
ville, what would be the rate of personalities?
A. Can you make how long it would take for that investment
safe? - -
Q. What is the rate of personalities?
A. That is the point; the rate of personalities is variable;
it may run from ten feet to ten feet a day, even as low
as ten a day in winter; it depends on the irrigation.
Q. How many years would it take to personalize Immoral-
ville with the Immoral well?
A. You mean an identical flow of water?
Q. Yes, sir.
A. That is not the way that water travels. When you pump
some of this water, you take off that well - you start the
water in motion, and that water would keep on flowing from
other in motion, and that water would keep on flowing from
other in motion, and if it would be affected
within a short time, a week or two years depending on the
resistance.
Q. If there was no water behind the Immoral well?
A. If there was no water depending in it but the flow
of the water.
Q. You've supposed that in the first it supply?
A. Yes, sir; but it that the land of your interference.
Q. That is water behind the Immoral wells is well in a

front of them?

A I know there is.

Q Suppose, as you say, it leaves the Newport wells, it don't leave a void there; another drop comes in to take its place?

A There is.

Q Your rate of percolation must determine the time that the effect would take place?

A No, the rate of percolation has nothing to do with that question at all; that is a transmission of pressure. It is like filling a pipe line full of water, and you put water in the upper end of it, and open a valve at the lower end, it comes out instantly. You can take a block of sandstone which is, may be, ten feet in diameter, you saturate that with water till it will hold no more, and put it above the ground, and drop one drop of water on the top and instantly the drop will drop out below; that is a transmission of pressure. While it is not the same drop of water, the drop you put on top takes the place -

Q I think I have your theory and I think you have it in the record. Illustrating by a column of sand in the tube, an upright tube, you have it full of water.

A Saturated.

Q Saturated. You have it saturated with water; you draw off a foot below, ofcourse it will immediately sink a foot from the top?

A Yes, sir.

Q That is your proposition?

A That is the proposition.

Proof of Theorem.

A. I guess I can be.

Q. Suppose, as you say, it takes the impact only, it doesn't leave a vital force; another dry cannon is to take the place.

A. Don't do.

Q. Circumstances of possibility can determine the time that the effect would take place.

A. No, the rate of propulsion can continue to be with that operation as well; that is a transmission of pressure. If in the falling a pipe like full of water, one can not make the upper end of it, and keep a piece at the lower end, it runs out immediately. Now take a column of atmosphere which, say is, the face is diminished, you maintain that with water WHEN it will hold on more, and yet it where the opening, and then the force of water on the top and instantly the drop will drop and before; that is a transmission of pressure. While in the air the drop of water, the drop you put on top takes the place.

Q. I think I have your theory and I think you have it in the proof. Illustration in a column of water in the tube, in operation tube, you take it full of water.

A. Illustration.

Q. Suppose. The tube is entirely with water; you take off a tube below, whether it will immediately drop it out from the top?

A. Yes, sir.

Q. Then is your proposition?

A. That is the proposition.

Q If your well was at the top, and there was no water behind it, ofcourse your water would disappear there?

A Yes, sir.

Q Well, now, takeit in the middle, as Newport's wells are situated, in the middle of the valley, take it in the middle; you draw off a foot from the bottom; how long would it be before you would have that effect in the middle of the column, if it was being fed in from above?

A I don't understand that question.

Q Instead of ~~thinkxxxxx~~ taking your illustration from the top of the column takeitfrom the middle of the column. When will that be affected?

A The middle of the column is filled from the top; the top water drops down to fill it.

Q You have to affect the top before you can affect the middle?

A No,sir; the affect takes place in this manner: you take a tube and fill it with sand and saturate it, and you draw out a foot of water from the bottom, the foot next above is all the time coming down to fill it, and that transmission is almost instantaneous; it depends a little on the porosity of your sand; if your sand is very porous it is practically instantaneous; if fine it takes a little interval of time, and so on. When the proper interval of time has elapsed, you have the foot of void at the top that has disappeared out of your column.

Q Now, take it in the Menifee valley, where do you claim that the limit of the point is that the Temescal Company draws from?

Q. Different wells run at this top, and there may be water behind it, whereas your main well disappears (Laty)?

A. Yes, sir.

Q. Well, now, taking in the majority, as Dougherty's table are attached, in the middle of the valley, that is the middle; you drew off a few from the bottom; how long would it be before you would come to the middle of the volume, if it was being fed in from above?

A. I don't understand this question.

Q. Instead of withdrawing taking your filtration from the top of the column, facilitate the middle of the volume. Then will come to attention

A. The middle of the column is filled from the top; the top water-bearing zone is full.

Q. How have to affect the top before you can affect the middle?

A. Yes, sir; the effect takes place in this manner: you take a line and fill it with sand and attach it, and you draw out a few of water from the bottom, the first water drawn is all the time coming down to fill it, and then transmission is almost instantaneous; it depends a little on the quantity of your sand; if you have a very porous it is practically instantaneous; if that it takes a little interval of time, but so on. Then the pressure diminishes at some distance, you have the first of that at the top that has diminished at your volume.

Q. Then, take it in the counter valley, where as you plain that the level of the water in the Ferrand Tunnel stand lower.

A I think that the Temescal Water Company affects all the water in the Menifee Valley.

Q How far east?

A Well, I think all through that valley wherever the water is in contact.

Q Well, name the point if you can?

A Well, I say the entire valley; I can't make it any broader than that.

Q Up as far as Lindenberger's, three miles east?.

A Up at Winchester; I don't know where Lindenberger lives.

Q I think three miles east of Newport.

A On what section?

Q I think it is section 36.

A I would expect that the pumping has had some effect on that; not so much as at Mr Newport's.

Q What would you expect the results to be of the pumping at Temescal on Mr Lindenberger's place, say for instance they commenced pumping on the first of August, 1901. when would that affect be felt at Lindenberger's?

A That is pretty hardto say, because as I stated before the transmission of that pressure depends on the formation of the soil through which the pressure is passed, and that takes various times; I have seen in the San Bernardino Valley, where the material is coarse, I have seen it affected as far as three or four miles away, within half a minute; and over in this valley where the material is a more compact character it would take longer; it is like setting up a row of bricks and you knock down the first one, all the rest leaning against it, they will fall; it takes a certain

Q: I think that the General Sanity Company utilizes all the water in the Inwline Valley.

A: Impossible!

Q: Well, I think all things that valley-dwellers do make use of the water.

Q: Well, name the point if you must.

A: Well, I may for-mistake relying; I don't think it any greater than the.

Q: Do as I-or Lindenberger's, these other water.

A: Up at Lindenberger; I don't know where Lindenberger lives.

Q: I only have other water was or tempest.

A: Do what matter?

Q: I think it is better.

A: I would expect that the policy has had some effect on Sally; but as-such to in is Dwyer's.

Q: What would you expect the reality is be of the pumping at Tinsdale by in Lindenberger's Del plant, why for is-where they commenced pumping in the Plan of August, 1962, when would that effect be Pal's at Lindenberger's?

A: That is purely hearsay, because as I should before the commencement that strange thereto in the formation of the well through which the reservoir is pumped, the Lake Eden pumping plant; I have done in the Sun Mountain Valley, where the material is heavy, I have made injurious or far-as have or fire-walls only, which half's cement; and you in this valley where the material is a very compact cemented Sand Gravel; is it like putting up a wire of bricks and pre-pumps down the river-sum, all for the Lindenberg-Eden at. May with Pal; it make a certain

length of time till the last one falls."

Did you so testify in that case?

Mr McKinley: Objected to as not cross examination, and as incompetent, and as calling for statements upon a variety of conditions which are not shown.

The Court: The objection is sustained.

Q Then I will ask you this question, beginning at page 1110, line 28, if you did not testify in this way:

" I have seen in the San Bernardino Valley where the material is coarse, I have seen it affected as far as three or four miles away, within half a minute; and over in this valley where the material is a more compact character, it would take longer; it is like setting up a row of bricks and you knockdown the first one , all the rest leaning against it they will fall; it takes a certain length of time till the last one falls."

Didn't you so testify?

Mr McKinley: Objected to as not cross examination and incompetent and calling for a statement as to specific conditions.

The Court: Overruled.

A I did so testify, and I was then testifying about water under pressure in the San Bernardino Valley, and also in the Temescal, in the Perris Valley; I was not testifying about percolating water, but water under pressure in a vein, the same as it would be in a pipe.

Q You so testified in that case about the water under pressure?

A I think you read into the record a moment ago, the portion

Length of time will you have to talk?

Did you do anything in this case?

Mr. Gallivan: Objected to as not proper examination, immaterial, incompetent, and as calling for a conclusion upon a variety of conditions which are not shown.

The Court: The objection is overruled.

Q. Then I will ask you this question, beginning on page 1118, line 22, if you did not testify in this way:

"I have been in the San Joaquin Valley since the material in question, I have seen it extended so far as there is fine silica sand, which makes it a choice, and was in this valley every the material is a more compact structure, it would take longer; it is like mixing up a pan of batter and you can always tell fine sand, but the good looking material is hard to tell; it takes a certain length of time till you know its value."

Did you so testify?

Mr. Gallivan: Objected to as not proper examination and incompetent and calling for a statement as to specific conditions.

The Court: Overruled.

A. I did so testify, and I was then testifying about water conditions in the San Joaquin Valley, and also in Bakersfield, in the Kern Valley; I was not testifying about permitting water, but water under pressure in a tank, the same as it would be in a pipe.

Q. You do testified in that case about the water under pressure?

A. I think you said that the product a second one, the testing

that was ruled out, a number of statements of the water being under pressure; all the testimony was given under the assumption of pressure.

Q Did you assume anywhere in that case, that there was any pressure on the underground waters of the Perris Valley?

A I think that was the whole theory of the case; I think that was the whole presumption of the case, that there was a presumption of pressure instead of a percolation of water, the same as in the Katz-Walkinshaw case in San Bernardino.

Q Don't you remember one of the fights we had in that case was that there was three or four wells north of the pumping plant, where it was contended that that was artesian water and you said it was not?

~~The Court~~ Mr McKinley: Objected to as not cross examination.

The Court: Sustained.

Q Now, reading again from page 974 of the same case, beginning at line 23, didn't you testify as follows:

"Now, the operation of these pumps has shown by the various profiles, as indicated on Exhibit Q and R, reversed the slope of the waterplane of saturation from the direction of the watershed where it formerly flowed, and turned it toward the pumping plants of the Temescal Water Company at Ethenac, and stations 1 to 4; the outlet of this water was originally out through the two openings of the Menifee and Perris valleys, and the plane sloped in that direction; the operation of these pumps has intercepted and reversed the slope of the waterplane towards the pumps."

Then beginning again on page 975:

didn't you testify as follows:

" That water is now being drawn from Mr Newport's South ranch directly towards Ethenac, and from Newport's north ranch directly towards station 1 to 4 of the Temescal Water Company, having instead of a level plane practically across the valley on that contour, the plane has now been drawn down and intercepted, so the draft of the water extends clear across these valleys."

Didn't you so testify?

Mr McKinley: Objected to as not cross examination and incompetent.

The Court: Sustained.

Mr Haskell: Exception.

Q Now, Mr Tinkle, on this piece of paper I have marked a diagram, with certain squares, 1, 2, 3, 4, 5; we will assume thateach one of the squares represents an orifice of one square foot coming out of a large box filled with sand, of a similar porosity to the sands of the Cucamonga plains, of uniform porosity,- we will assume that this particular quality represented here will be of uniform porosity. I understood you to say thatif water was issuing out of all of those squares to the level of the top one in one instance and then it should drop so that it only issued out of the two lower, that you could ascertain the quantity that would come out of each, by measuring the volume issuing in either instance: Is that correct?

A Mr Haskell, I must admit that I am unable to understand what you are driving at; I never saw the diagram before and never had the problem submitted to me before.

Mr. Jones, Dorothy, Jackson:

"Each worker is now having trouble or difficulty. Each needs carefully thought out, and then immediately acted upon. Carefully thought out plans, to be of the most real value, must be made in the light of the present and future. Making decisions of a local plan particularly serious for solving in high-tension, the plan had now been drawn down and interrupted, so the level of the water which exists that cross-lines valley."

Dick's you my ability:

Dr. Dalziel: Objected to be not given responsibility and management.

The Dean: Hesitant.

Dr. Dalziel: Stupidness.

Dr. Dan, by table, on this piece of paper I have drawn a diagram, with certain equations, 1, 2, 3, 4, 5; we will assume that the equations represents an artifact of our square dark marble rod of a large box filled with wood, of a singular geometry in the middle of the discussion plans, of unique geometry,- we will assume that this particular quality represents here. Dalziel is of supreme priority. I understand you to say (Dalziel) you think with at all of have squares of the level of the top was in our hands and then it should give us back it only lesson and of the two lines, that you could compute the quality that could come out of each. If measuring the volume lessen in either lines: Is that correct?

A. Dr. Dalziel, I just said that I am using the activities that you are driving at; I agree and the diagram before and have not the problem equations is in order.

The Court: You have several squares number 1, 2, 3, 4, 5,; called orifices; are those to represent spaces in the tube or square box?

Mr Haskell: No, I have divided it up thatway, for the purpose of theoretical subdivision.

The Court: Is that supposed to be vertical or horizontal?

Mr Haskell: Vertical. Vertical along line AD

Mr McKinley: We object to the question on the ground that it is irrelevant, immaterial, incompetent, assuming facts not shown, and unintelligible.

Mr Haskell: The witness has testified here that by taking the level of the top of the water in the 16th street wells, and the level at the intake of the pipe line from the Cucamonga Springs, and comparing the quantity of water that he finds there at one time, that it should correspond, if there was any relation between the two, to the quantity of water that might be found at any other time, with a given level in the well.

Mr McKinley: The testimony of the witness was that if the testimony of the witnesses for the plaintiff was correct that the hydraulic head there had a relation to the discharge at the Cucamonga Springs, then that discharge should correspond; but this witness claims that such relationship did not exist.

Mr Haskell: I want to see whether he can establish a rule of measurement and how he does it; he has applied it to the Cucamonga Springs.

The Court: Those five units represent the head of water?

Mr Haskell: Yes, sir.

The Court: The Bar certain reports number 1, 2, 3, 4, 5; valid evidence; are there to represent opinion in the case as stands now?

Mr Kendall: No, I have stated it in context, for the purpose of Constitutional construction.

The Court: It has suggested to be verified or particularly.

Mr Kendall: Verbal. Verbal stand-line 18.

Mr Gallery: To object to the question on the ground that it is irrelevant, immaterial, incompetent, passing Tube not shown, and nonfulfillable.

Mr Kendall: The witness has verified more than by taking the level of the top of the water in the Tube where valve, and the level at the intake of the pipe from the Cham-ber Station, and comparing the capability of water that is flowing at one time, that is objectively correct, if there was any relation between the two, to the quantity of water that might be found at any other time, with a given level in the well.

Mr Gallery: The testimony of the witness was that if the testimony of the witnesses for the plaintiff was correct that the hydraulic head there had a relation to the discharge at the Chamber Spring, when that discharge would increase; but this witness claims that such relationship did not exist.

Mr Kendall: I want to see whether he has established a fair measurement and fair rule; he has applied it to the Chamber Spring.

The Court: Does this quite represent the kind of matter?

Mr Kendall: Yes, sir.

Mr Haskell, Q Now, can you make such a computation?

A I wish to state that there are some features in the problem still not stated, so I don't believe with the statement made by Mr Haskell, that any one could makethe computation. He has not said anything about - -

Q Well, that is all I want to know on that feature. Suppose the sand filling the box was fully filled to the capacity of its porosity with water, to the top of figure number 1, square number 1, and water was issuing out of one of those squares, could you compute by measuring the amount of water flowing out, how much would flow out of the lower square, if none was flowing out above it, suppose the saturation in the box was reduced to the level of the upper part of the lower square, could you pute it then?

A I would advise you, Mr Haskell, to take a course in hydraulics - -

Q I judge you are the man to take a course in hydraulics before you get through with it.

The Court: He is entitled to an answer to the question if you can give it.

A I think that some of the ~~xxxxxxxxxx~~ conditions put into the question make it impossible to answer it; he has contradictory conditions, which would so affect the question as to make any answer impossible, without modifying his whole conditions to correspond with what I spoke of in my testimony, previously.

Q Suppose you have a box of sand, ten feet square and filled with water, and a slot a foot wide down one side of it, to the bottom, and the sand should be retained in

place by a screen of the same porosity as the sand itself, by measuring the water issuing out of such an orifice, could you tell the quantity of water that would issue out of a box ten feet square, and one foot deep, with a foot square orifice?

A I don't understand that proposition; he is referring to one box with one kind of an orifice and some sand, and another box with another kind of an orifice in that, and he has it so confused that the conditions are not so that I could answer it. I should think the proper way would be to make a diagram of the two boxes, showing the condition in each, and the amount of sand in each, and the size of the openings, and then it could be solved to a mathematical certainty.

The Court: I should suppose, without being an engineer, that each hole in your screen would immediately be filled by a grain of sand, and that would stop the operation right there.

A I was thinking of that, and there is another objection just as serious, that the box is of such small size and the openings are so large that I doubt whether there would be any method of measuring the water accurately in the interval of time, during which your observation would have to be made; a foot orifice out of a box of that small size, would practically empty it before you could make your observations.

Q Well, then we will put it this way: Suppose that there is a place in the Cucamonga hills, vertically five feet high and one foot wide, filled with sand of an absolute uniform porosity, and that supplies a given amount of water and you

plane--by a screen of some sort--perhaps as the same itself, by connecting the water-heating and of pipes or cylinders, would physically the quantity of water that would change out of a hot-water system, and the fact, again, which is that heat-energy exists.

4. I don't understand that proposition; he is saying to me he has with some kind of an article and more sound, and somehow can write another size or an article in that, and he has to acknowledge that the conditions are not be that I would answer it. I should think he ought only could in the same a diagram of the hot water, showing the conditions in each, and the amount of cooling each, and the size of the opening, and then it could be solved in a satisfactory manner.

The Court: I admit anyone, without being an engineer, that such this is your process could immediately be fixed up by a crank of wood, and that would why the operation that there.

A. I was thinking of that, and there is another objection just in anyone, that the heat in of each pipe and the opening are so large that I think another thing would be very valued of measuring the water accurately in the time of one of time, during which your observation would have to be made; a fact or fight one of a hot of that would make.

When practically every is before you would make your determination.

Q. Well, then we will put it this way: Suppose that there is a place in the Dominion Office, certainly five feet high and one foot wide, filled with such of an article--different quantity, and that another a system exists, or more or you

measure it, from such measurement could you determine how much water would flow out if the passage wereof the same width but ten feet high?

A You could, if you at the same time of making your measurement of discharge, also observed the hydraulic head, and if there were no other discharges anywhere else coming out of that same box, or out of the space in the Cucamonga Red Hills.

Q How would you do it?

A You would measure the discharge; you would measure the hydraulic head at the same time, and then you would do as I did in my problem on Defendants' Exhibit Z1, you would work backwards from your head and from your discharge, and solve the value of the coefficient M; when you have determined that coefficient of discharge, it will include all resistances and impediences which exist in the strata, and assuming that that regulates it, and that there are no other outlets or circumstances which do regulate it, then the other discharges would follow exactly as the square root of twice the accelerated gravity into the head, multiplied by the same coefficient.

Q Now, we will suppose that this orifice at the top of ten feet widens out to a width of ten feet, one foot high, and filled with sand of a different porosity, and that the water-plane should be absolutely at the level of 11 feet, could you then in any way by measuring the amount of water coming out of this supposed orifice ten feet high, tell how much water would come out of the orifice 11 feet high?

A If you change the porosity through which the water moves

you have to make another experiment for your coefficient; if you assume you have changed the conditions through which the water passes that destroys the value of your first experiment.

Q Then if that waterplane rises above the Cucamonga Springs in the 16th street wells, where the water plane rises there, if it rises ten feet, in order to tell what effect it would have on the quantity of water flowing out of the Cucamonga Springs, you would have to make a new test, wouldn't you?

A No, not unless you assume that there is a different formation every ten feet, and then if you do that you would have to examine your dates on which the heads were absolutely the same, to see if the discharges were the same, because the cross section would certainly be the same, under heads of the same height wouldn't they? Now, right on that point, as illustrating this answer, I wish to give you some facts from the record in this case: If you will turn to page 92 of the reporters' Transcript, in this case, you will find that on May 20, 1905, the elevation of water in well number 7 was 1341.7 feet; now if you turn to plaintiffs' Exhibit 3, you will find that on that date exhibit 3 gives the discharge of the Cucamonga Springs as 6.62 inches. Now, if you will turn to the Reporter's transcript, at page 98, under date of February 14, 1906, you will find that the elevation of the well number 7, at the Haskell wells, was 1341.7, feet, exactly the same as it was on May 20, 1905; now, if you also turn to page 3451 of the reporter's transcript, you will find on this same date, February 14, 1906, the discharge of the Cucamonga Springs was 9.23 inches; and you will observe there that the elevation in well number 7 was exactly the same on

the two dates mentioned, whereas the discharge of Cucamonga Springs varied nearly fifty percent; that alone is sufficient to negative your proposition of there being any change in the formation; certainly you won't claim that when the head is the same that your assumption would apply; I have several more of these if you wish to hear them; the record is full of them and disprove that proposition, and the one Mr Britt mentioned the other day.

Mr Stevens: I move to strike out the statement of the witness as to the record being full of certain things, on the ground that it is not responsive to any question, and as being a statement that the witness has no right to make.

The Court: Stricken out.

Mr Haskell, Q You admit that with the changing porosity of the aperture through which water may percolate, and a change of width of material through which it may percolate that you cannot make an accurate measurement without first making a test?

A You must have a test first for your coefficient of resistance, and after you have once made your test, unless you empty your box and change the material in the box, or in your formation, your discharge will be the same every time your head is the same, and varies from that at times when the head is not the same, in the proportion in which the square root of the head, multiplied by twice the accelleration of gravity, varies, as modified by the coefficient of resistance.

Q Right there I desire to inquire upon what scientific authority you base the statement that percolating water

varies as to the square root of its head?

A I base that upon every authority which has ever been written dealing with flowing water, or percolating water, or any kind of flowing water.

Q Did you ever read the Government Report of the United States, entitled "Principles and Conditions of the Movements of Ground water, by Franklin Hiram King, with a Theoretical Investigation of the Motion of Ground Waters, by Charles Summer ~~Xxxli~~ Slichter," issued by the Department of the Interior, United States Geological Survey, in 1899?

A Yes, sir; I have read that and I have read several more by Mr Slichter.

Q Let me read you from page 203 of this work, paragraph 8, "Of 152 comparisons of the flow of water through columns of sand from 105.4 to 1022 centimeters long under pressures from 1 centimeter to 1150 centimeters of water, in all but 32 cases the flow increased faster than the pressure."

You have read that haven't you?

A I have read it; yes, sir; certainly I have read it.

Q Isn't this volume full of experimental conditions where the solution is found that the water flowing by percolation flows faster than the increase of pressure?

A You know why that is: ~~xxxxxx~~ because the resistance is different; that is what we have said all the way along; if you read that whole book and see the doctrine laid down, you will find that it speaks of no variation other than like I mentioned - except that which is caused by the difference in the resistance.

Q And were not all these experiments founded upon water

percolating through sand?

A They were, but the number of different tubes, and the difference in the sand accounts for the statement which you read there.

Q And isn't the conclusion drawn from this to the general effect that that is the law governing percolating water, that it increases a little faster than the pressure?

A I would ask you to read the conclusion you refer to, since I am unable to remember everything in that book by memory, and before discussing anything of that sort I would like to have it read.

Q I will read paragraph 9 of the same page:

"The flow of water has increased faster than the pressure by amounts varying with the sands from 0 to 45.79 percent."

A If you will examine that book and read all of it, you will find that it based on experiments with sands run through screens of certain sizes and put in different tubes of varying lengths, and the flow of water through the sands under varying heads, and it shows that by human ability we cannot select sand of the same degree of coarseness or fineness, after having selected sands and put them in one tube, we cannot select exactly the same quality of sand for another tube; I remember that statement and that is the only statement made by the author, where you have stated right now; in other words you cannot imitate in one tube, by selecting the sand and obtaining it exactly similar to the sand which you have used in an experiment in another tube.

Q I read from the same book, page 204, about halfway down the page:

"The evidence which has been presented regarding the flow of water through rock and through sands demonstrates beyond question that it does, under certain conditions, increase faster than the pressure."

A That is true, under certain conditions,- where there is variability in the transmission medium; but that is not found to be true only when the density of the material has varied. It will not vary when the test is made in the same tube and with the same sand; and I speak from certain knowledge having made the experiment repeatedly; if you do not vary the density of the material in that tube, and use water of the same temperature, you will always find that it varies as the square root of the head; we made these tests repeatedly in the university when I was there, where Mr Slichter is now working.

Q The Poiseuille-Meyer law - Do you understand that there was a law established by the observations of those two gentlemen?

A I have the reports of those gentlemen's investigations.

Q Do you know what it is?

A I can't tell you what it is from recollection.

Q Don't you know as a matter of fact they established the same law, that water flows through sand, percolates through sand, a little faster, according to its pressure, increase the pressure and it flows a little faster than it did before in proportion?

The Court: Isn't that evident, that the flow would increase with the pressure?

Mr Haskell: No- That it increases faster than the pressure?

A It is idle to discuss those things without going to the limit; will you please tell me if you can refer to any place in that book where there is a statement that the discharge of water through sand does not vary as the square root of the head or the slope of the formation.

Q I just read it to you and I will read you some more: "The evidence which has been presented regarding the flow of water through rock and through sands demonstrates beyond question that it does, under certain conditions, increase faster than the pressure."

A Under certain conditions it does; those conditions have to be determined before you can determine why it does; if you apply that principle to your diagram here, you would be in worse trouble than you would from the application of the general principle.

Mr Stevens: We move that the last statement of the witness that we would be in worse trouble, etc., be stricken out.

The Court: Stricken out.

-o-

Here the Court takes a recess until Monday, April 12, 1909, at 10:30 o'clock a.m.

-o-

J.W.McKINLEY.

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Company, Plaintiff vs. San Antonio Water Company, Defendant	Vol. 50. Monday, April 12, 1909

INDEX.

F. C. Finkle,	(Haskell, resuming)	4492
" " "	(Goodcell)	4526

I. BENJAMIN, Official Reporter

Monday, April 12, 1909. Fiftieth day.

F. C. FINKLE.

(Cross Examination resumed. Haskell.)

Mr. Haskell: Q Mr. Finkle, how high do you think the surface of this saturated plane is north of the Sixteenth Street wells above the ~~course~~ crest of the ancient aluvium along the line G H, at the present time?

A There isn't in my judgment any saturated plane up there at the line G H.

Q Then you think there is no saturation above the line G H?

A No, not saturation. There is a difference between saturation and percolation through the soil. At that point my opinion is that there is not sufficient water to fill all the voids and experiments have shown that when waters simply travel through the soil without being in sufficient quantity to saturate it, it carries only fifty or seventy-five per cent. of the amount which is carried when the soil is fully saturated.

Q How far down south of the line G H do you think that you have to pass before there is a fully saturated plane above the crest of the ancient aluvium.

The Court: Saturated mass, I suppose you mean?

Mr. Haskell: Yes.

A That I don't know. There have never been any wells bored in that neighborhood or experiments made to determine.

Q I have understood you to say that the material north of the line G H is much more porous than it is south of the line G H?

A I suppose in general that has been the effect of my testimony, that the nearer the mountains you get the coarser the material; but I do not wish to be understood as saying that

that line is any line of demarkation absolutely.

Q And the water that comes down through the mountain canyon - the runoff -- penetrates this aluvium north of the line G H, and through that portion of the aluvium it travels faster than it does sourth, of it, doesn't it?

A I don't know about that. It may be very doubtful, because that is dried out each year and fills with air, and when it dries out and fills with air the air has to be expelled before the water can pass through it, and it is quite a long time that it takes for water going into soil filled with air to expel it.

Q But the water will travel faster through this aluvium north of the line G H than it will through the aluvium south of it on account of the greater porocity?

A After the conditions have been established alike in borth the movement is more rapid above than below. But, as I said, the soil having beeonce dried out and filled with atmosphere, the water has to replace that. If you try to fill a tank filled with soil and gravel and sand which had been dried, with water, you will see the difficulty of getting water into it.

Q In any event, no matter what those conditions may be as to whether there is a fully saturated plane at the line G H, on account of the increased rainfall for the last nine years and particularlyin the last four years, and on account of the distribution of ~~rain~~ runoff by the defendants in this case north of the line G H in the last four years, there has been a much greater supply than the average to these ducts which you say lead down to the Cu amonga springs and all the other out-lets too to the ancient aluvium? Is that not true?

that time is only less of importance definitely.

2. And how water level comes down through the material surface - the measurit - yesterday's lift operation would, at the time 2 p, and through that portion of the channel is towards later time is also lowered, at 12, it isn't it.

4. I don't know about that. It may be very dangerous, however much is dried out much year and lift this air, and then it may be not and lift it up air but we're waiting before the water-bar goes through it, and it is quite a long time that it takes the water-gauge into will lifted with air is equal 12.

3. For the water will lower tower through this elevation here at the time 2 p that it will behind the lifting work of 12 or without of the greater potential.

4. After the operations have been completed with to open the network is more rapid never than before. And, in 2 weeks, the well having lowered with its lift with equipment, the water has to replace that. If you lay in 1121 a back filled well and gravel and bend which the tower dried, with water, you will see the difference of getting water back 12.

5. In any event, the matter what water conditions may be as to whether there is a fully adjusted plan at the time 2 p, or whether of the lowered pumping for the last wide years on particularly the last two years, and on account of the distribution of some water by the reservoirs in this case water at the time 2 p in the last two years, there has been a much greater supply than the average to have made this per day land done to the or manage spring and all the water-

[illegible] in the [illegible] stretch. It that has [illegible]

A I think that is shown by the increased discharge down there if nothing else.

Q Now then, this discharge through the ducts is under pressure

A After it reaches the point where --

Q The line G H?

A I didn't say that. Those ducts, I didn't say they extended up to that line. I don't think they do, as a well defined pressure conduit. I think the pressure begins below that point.

Q Why do you say that the pressure begins below it?

A For this reason; that the examination made of the Red Hill discloses the fact that for some period previous there had been rising water out here on the Red Hill much higher than today. You find the black vegetable mold almost to the top of those hills, and in fact never since I have known the Red Hill, in '90, was the water rising on these hills as the old evidences disclose. That shows that the pressure at some ancient time was very much greater than it has ever been since any day that we have known it. And if so, those ducts must have extended further up -- not extended, but filled further up -- and therefore I say the evidence today is that the upper end of those ducts is empty, and the water is merely percolating down to the point where they are under pressure.

Q But the upper end of the ducts receive the water before it reaches the surface of the saturated plane below the line G H?

A Even assuming that they do, I don't understand what difference that would make unless the ducts were filled up to that point, because the pressure cannot be transmitted till the ducts are filled to their head. You can illustrate that by taking an inverted siphon with a capacity of discharging a

thousand inches of water. If you only have sufficient water to discharge 200 inches, it will not stand in the upper end to the upper end of the pipe; as long as you don't have sufficient water coming in there, it doesn't matter how much water is running down ~~in the water~~ through the upper end of the pipe which is not under pressure. It can only discharge the amount coming in or two hundred inches. Therefore, I say it is clear that the ducts are not under pressure to their upper ends.

Q You don't agree with Mr. Trask then, that within a few days after a rain which brings water on to this debris cone above the line C D, that its effect will be felt in the tunnels and wells and springs below?

A I didn't understand Mr. Trask that way. I understand that he said the same as I did, or meant the same as I did, that it was a local rain which affected it. If he said that, I don't agree with it. That I have always understood as affecting the tunnels and wells quickly is the local rain on the immediate watersheds adjacent and not up there at that point.

Q You don't agree then with that statement?

A If he made that statement I can't agree with it. But I do agree with the statement, if he made it, and limited it to the local watershed of all those tunnels and wells.

Q You yourself have said these ducts convey water under high pressure?

A They do, from the points where they are under high pressure. That point is variable. After dry years the water will recede down those ducts and the supply is diminished. After wet years they fill up and the pressure will discharge more water.

Q Those ducts for the last nine years have had more than the

average feed, have they not?

A I don't ~~agree~~ agree with you, because the interval of time has something to do with getting down to the pressure point.

Q The ducts, not the pressure points; the ducts themselves have had more than the average feed for nine years?

A You said that. I haven't said it.

Q Don't the rainfall show more than the average for the last nine years?

A Yes, but I have told you that ~~[illegible]~~ and a large part of it has not yet reached the ducts where they are under pressure.

Q But don't these ducts extend up to the ancient aluvium where there is no cover to it between the ancient and modern?

A But suppose they do? That doesn't mean they are under pressure, right up to that point.

Q I am notspeaking about being under pressure. But those waters do come into those ducts there, don't they?

A I do say unquestionably that these do extend up there somewhere in that vicinity, but as long as they are not filled up to that point with water they are not under pressure up to that point. And the water that comes into those ducts, so far as that part which is not under pressure is concerned, ~~it~~ has to travel through that the same as through the recent aluvium. The moment that it comes into ~~[illegible]~~ the duct, with sufficient water -- more than the average water -- to feed it, it is under pressure, because it is confined.

A No, sir. The moment it strikes the upper particle of water which is under pressure in the duct, it becomes part of the pressure. And as long as it is moving by gravity above that

point, tending down to that point, it is not under pressure and has no effect on the pressure or discharge below. It is the same as a pipe line. If you had a pipe line in which the upper end is partly empty, as long as the water is flowing down the pipe line, it doesn't have anything to do with the pressure in the pipe or add to the head in the pipe ; but after it strikes the upper end of the water that is under pressure, it becomes a part of it.

Q We will take your illustration that you had a pipe line a mile long with a head a hundred feet higher than the outlet, and we will say that the lower one-third of the water flows out and is under pressure, but there is a feed at the top that starts into it and comes down. Isn't that feed forced along by the water behind it?

A That is then simply flowing as it is in an open conduit and does not affect the pressure on the pipe until it strikes the upper end of the portion which is under pressure, or the upper end of the one-third of which you speak. You have to allow that interval of time between the upper part which is empty and the one-third down below which is filled.

Q Coming back to another proposition, which we left last Friday, as I understand you to say the floor of this Cucamonga plain was under the sea in the tertiary period?

A I think it must have been under the sea; yes; the same as the portion near Los Angeles and the Chino hills.

Q In the early quaternary period it rose and this ancient aluvium was carried into it from these hills?

A The mountains rose during the latter part of the tertiary or in the teritary. This range of mountains is known to have

come up in the tertiary, and therefore the first deposit which we see is the ancient aluvium deposited in the pleistocene.

And that was deposited in the glacial period of the quaternary contemporaneously with the glacial period of the quaternary.

Q I noticed the other day that you divided up the quaternary period into the pleistocene and the recent period?

A Into three. The pleistocene --

Q How do you divide the quaternary period?

A Into three: The pleistocene, the champlain, and the recent.

Q But the authorities generally divided into the pleistocene and the recent, calling the glacial and the champlain the pleistocene period.

A Some of the authorities, like Dana day that the pleistocene is divided into the glacial and champlain. Others use all three terms, but it means the same thing.

Q Now then, in the early quaternary period this ancient aluvium was carried into the Cucamonga plains?

A It was during the progress of the quaternary period before the champlain.

Q Then, in the champlain period, the whole thing sunk below the level of the sea?

A I think the valley portion descended to a lower level than the surrounding land, at least so that it was covered with water.

Q Well, below the level of the sea?

A It probably was below the level of the sea, but it is not

known definitely that it was at that point.

Q How far east did that lake that you speak of extend?

A In regard to that, Mr. Haskell, during the early glacial period the San Bernardino mountains are not supposed to have been in existence --

Q No, don't wander away too early. I am talking about the time the lake was in there.

Mr. Schinley: The answer is responsive, and counsel has no right to interrupt it.

The Court: I don't know. It has not gone far enough. I understand that Mr. Haskell wants to limit you to the quaternary period only.

Mr. Haskell: At the time the lake was there, how far east did the lake extend?

A (The witness's answer is read) -- and there was no mountain in existence between the San Antonio peak and the San Gorgonio peak, and therefore allof that part which is now the San Bernardino range as well as this valley, was under water. Whether it was actually below sea level or about at sea level, I must say I have not figured out. But that can be figured out by taking the elevation of the Champlain gravels and correlating them with the deposits made in other periods.

Q You have stated that the shore of this lake extended as far east as the mouth of Lytle Creek.

A It extended much further east, and the only portions of the land that I know were not under that lake were some of the Santa Ana Mountains in the Temescal mountain range, and

the San Gorgonio peak and the San Gabriel range, so far as the evidence goes.

Q. I will ask you if you didn't testify in the case of Barton vs. The Riverside Water Company and others, tried in this court, as follows, reading from page 1554, beginning with line 26:

"A. The foundation of the artesian basin in my judgment is a marine deposit which was made at the time that the country was under sea level. That is, I mean, the floor of the basin. And if you could bore down at any point in the basin you would find the same formation as the dike. I believe that this deposit was formed under the level of the sea originally, in strata, and that subsequently the floor was folded by lateral pressure in the manner that I formerly referred to; and as this folding took place, which extended through many thousands of years along in geological ages, that the detritus was washed down from the San Bernardino mountains and filled up the pocket of this fold; that this deposit was all made in running water; that the water was flowing at more or less velocity across the basin when the deposits were made; and that gradually as the fold was formed and lifted up the recess behind, it filled up with this material from the mountains. And that the reason why you find clay lozenges or pockets and other pockets of sand among it, is that the rainfall in those days varied the same as it does now. There were dry periods and wet periods. When you had a series of wet years the washing from the mountains would be more than in the dry years, and it would be carried into

basin;; and in dry years the sediment would be less in quantity and finer, thus forming the clay strata. And in this way I believe the whole basin was filled up while the dike was being lifted up to its present level; that these deposits of clay are not in the form of blankets, because they were formed in running water and could not be in the form of blankets but must be in the form of pockets, which is also demonstrated by the records of wells in the valley that the clay strata do not conform to one another, nor are they of the same thickness."

Did you so testify?

Mr. McKinley: Objected to as not cross-examination, and that it applies to another locality.

The Court: The objection is overruled. Defendants except.

A Yes. I testified to that. That is true absolutely in the San Bernardino valley. The dike of the San Bernardino valley belongs to the champlain deposit. It is an extension of the Texas point deposit, in Lytle Creek, and this deposit of the San Bernardino valley was made at the same periods, when in the last deposits in the Cucamonga basin were made. They do not apply to the ancient aluvium. The San Bernardino valley is in the recent alluvium. And while the artesian basin in the San Bernardino valley was formed exactly as I have there stated, it does not apply to the artesian formation at the Red Hills which belongs to a previous Geological period.

Q But you stated the lake -- you have stated in your testimony on direct examination that this Cucamonga lake extended as far east as this valley, and that the Lytle Creek deposits

show that it was a shore of that lake:

A. Certainly, Mr. Haskell. If you will reflect a moment, you will see that there is nothing inconsistent ~~with~~ about that. In the early quaternary deposit -- when the early quaternary deposit at the Red Hills was laid down, there was no San Bernardino mountain range in existence. That was all under water. The first time the San Bernardino mountain range came into existence was during the latter part or close of the Champlain period when the lake condition was about disappearing.

However, during the Champlain period the only stream which was running into the valley was the most easterly stream, Lytle Creek, coming from the San Antonio peak. Lytle Creek at that time, during the close of the Champlain period, deposited not only the gravels which you see in the Texas Point Line, but also deposited the material which made the fill ~~of~~ in the San Bernardino basin. At that time, the artesian basin had not been completed. And after the close of the Champlain, when the second uplift commenced, the San Bernardino basin was formed by the same uplift which lifted up the Red Hills of Cucamonga, and the foundation of the San Bernardino basin is of the glacial portion, as you have ~~written~~ cited Lana. And other authors say that the Champlain and Pleistocene are grouped together ~~by some authors~~. And if you were to bore down in the San Bernardino basin, you would find the same gravels that you find in the dike, also the same formation in the Texas Point Line and other points in the foothills west of Lytle Creek. The upper part of the San Bernardino basin, the entire artesian basin, was formed in the recent period which we are now living in, and formed by currents of flowing water

as described in that answer. My opinion remains the same as it was then.

Q You have fully explained that, have you?

A I think so. I could give you some authority on the respective ages of the mountain, like Hendenhall, but I think I have explained it, and the authorities agree with me on the whole thing.

Q At what time did this lake begin to disappear?

A At what point?

Q At what time?

A At what point do you refer to?

Q In the region of the -- Well, in the region of Lytle Creek.

Mr. McKinley: Objected to as immaterial and not proper cross-examination.

The Court: It is a little too far from the region in controversy.

Q Well, in the region of the Red Hills?

A It began to disappear in what is usually called the latter part of the Champlain period, when there was a marked beginning of the differential uplift along the entire range. The lake became shallower and shallower as the uplift progressed, and these mountains rose higher and higher.

Q How high did they get? Higher than they are now?

A That is a hard problem to answer. The mountains have been denuded some, and we don't know just when the uplift ceased. It may be that during the latter part they have not risen any faster than they have been denuded; and in fact, it is believed that they are still rising slowly. If they have not

been rising faster than they have been denuded, they have never been higher than they are now.

Q During this process of uplift, after the Champlain period, the waters came down out of these canyons the same as it does now?

A The activity of the streams was renewed by the uplift increasing the grade of the mountains, and they began to come down along the same lines which they come down now, ~~higher~~ more and ~~higher~~ more as the uplift progressed, they began to assume their present condition.

Q And the streams led their way across the bottom of what you call the lake?

A They began to fill up over the Champlain deposit and formed what is now called the recent deposit or gravel basin above the Red Hills.

Q And flowed across the bed of that lake?

A Are you assuming that the uplift was all in one day?

Q I am asking you the question.

A I wouldn't agree to that, because I believe that all the evidence shows, speaking of evidence from a geological standpoint, that that uplift was gradual -- that it was not all in one day, or in one year, or even a thousand years.

Q But it made channels across there ultimately, did it not?

A I don't think so, because the uplift was a gradual one, and the movement which we call differential, because it was not steady, and I think long before the lake had entirely disappeared the entire bottom had been covered with recent alluvium from the mountains, which we now classify as the re-

cent quaternary.

Q How are you going to cover the bottom with gravel when there is a lake condition?

A You can conceive of a lake which is being made gradually shallower by a progressive uplift, and as the lake became shallower by that movement the upper edge of the lake may be encroached on by streams more and more , and finally a point will be reached when the uplift has become so marked that the bottom of the lake is entirely above sea level, at which time the recent deposits were continuing to cover it,-- that is, before it covered the whole bottom. It must have taken some cycles of years to complete that uplift and cover the bottom of the lake, or put it into the condition in which you mean that the storm flood ~~naturally~~ entirely crossed it.

Q But you say it never flowed across it?

A I don't think it flowed entirely across it,at any time. The lake disappeared by stages. All the lakes of that kind ~~had~~ disappeared that way.

Q It flows across there in times of storms now?

A Yes, and has been doing so for a very long time.

Q What evidence have you found that has been shown in this case, of any clay deposit of any lake bottom near about the Cucamonga hills?

A The evidence is this; that where the Lady tunnel was extended through, it projected through to the surface, which could only exist on the hypothesis which I have last referred to, namely, that there was a lake when that was made, and that there was afterwards a fold of the bottom of that lake which lifted up that deposited formation, and that that fold

must have been by gradual stages, so that the old surface was preserved in a perfect state before the recent fill covered it.

Q. I call your attention to the evidence which showed in putting a bulkhead in that tunnel, that they found great difficulty in finding any place where they could erect a bulkhead, and even the water seeped around it.

A. That is no sign of what I am saying, because the bulkhead was put down near the end of the tunnel. If they had gone to the place of which I spoke in the tunnel, they would have found no difficulty until they got up to the recent alluvium which covers it higher up, and there you would have great difficulty. I suppose where the bulkhead was put in they first had to excavate through the recent alluvium, and then they got down to something which was good enough. But that was much nearer the mouth of the tunnel than here I speak of.

Q. Now, I will ask you this question which refers to something which appeared in your cross-examination last Friday, if you did not testify as follows in the case of Newport et al against Temescal Water Company, tried in Riverside several years ago, reading from page 974 of the transcript, beginning at line 10: "It first appears that all of the water in the Menifee and Perris valleys forms a continuous plane of saturation, in contact throughout; that the material is all porous enough to permit the percolation of water in every direction." Didn't you so testify?

Mr. McKinley: Objected to as not proper cross-examination.

The Court: The objection is sustained.

Q Here is a diagram on which you were examined on the blackboard. Will you kindly transfer that to a piece of paper?

A I would rather make a new one, because that one is not made correctly.

Q B represents the limit of the cone of depression in a well bored to the depth of the line X Z. Now, how far below the cone of depression do you think the water would be drawn?

A Out of the pipe?

Q Yes, out of the well?

A The tendency of the suction is to create a vacuum in the pipe between the point B and where you have drawn the line X Z. And while the water will not be drawn down to that point, the water will all be in motion at that point within the pipe.

Q And assuming that to be two hundred feet deep, will you give the same answer?

A The same answer would be given, unless the bottom of the well should be stopped in an extensive clay stratum. In hat event, the motion will extend down to the top of the clay stratum.

Q Suppose the pump was pumpting only 25 or 30 feet of water: Would you give the same answer?

A The same answer, except that the motion would be much less rapid.

Q Suppose that the well was extended to the line X A to the depth of 600 feet, and instead of pumping 25 or 30 inches of water, it pumped approximately 100 inches of water, and the cone of depression was cut down approximately five or tenn

feet further than before: How far then would you say the water would come from toward the bottom of the well?

A It would come from any point, ~~of~~ the bottom up, excepting where there were clay lozenges or clay strata through which the water could not enter the well pipe, providing of course that the well had been perforated in a water-bearing strata.

Q And in a lateral direction how far would the influence be felt?

A That deepening of the cone of depression would extend the lateral influence as long as you were in the same formation, not separated from some other water plane by a different formation or in a different formation.

Here the Court takes a recess until 2 o'clock p. m.

--o--

Afternoon Session 2 p.m.

Cross Examination of F. C. Finkle, Resumed:

Mr Haskell, Q. You said you wanted to make some explanation.

A. Yes, sir; I find that on last Friday, when you asked me some questions, which are given on page 4486, line 14, to line 18 of the transcript, and page 4489, line 12 to line 14 of the transcript, that in reading those extracts from the report referred to in those questions, the first one on page 203, paragraph 8 of that report, and the second one at paragraph 9 on the same page, ~~x~~ not having the context, or record before me, I did not interpret your quotations correctly, and the answers given were given under a misapprehension, namely, that the matter related to the comparison of different sands, which had been obtained by means of the aspirator, or by using screens and counting the grains, and comparing those obtained by one operation with those of another; but the answer I made has no application to the matter read from the book; I therefore wish to make a different answer to that matter; and what I have to say is as follows: In regard to the tests which are made under different pressures, by what is known as the tube process, it has been found in laboratory tests, that the experiments do not closely follow what is known as the Poiseuillian or sometimes called the Darcey Meyer law; the reasons for which authorities do not fully agree upon; the matter is one which I understand is in some dispute, some authorities claiming that it is due to the presence of entangled air in the sands, and the walls of the tube prevent this air from escaping; when the pressure has reached a very high point the air be-

comes compressed and increases the ~~horizontal~~ Arbitrary area for the water to flow; others claim that water becomes less viscous under high pressures, and under such high pressures as will create a slope of one to one, the viscosity of water becomes so much diminished as to cause a greater flow through the medium; again there are others who assert that the empyrical law referred to is not correctly derived, and that the modification should vary according to a ratio with the pressure; and on these various theories the discrepancy may be explained, as it is shown by experiments that at low pressures the phenomenon does not occur; and the pressures which we have to deal with in this case, not being in confined tubes, and being under heads so low as to make a flat slope, this problem does not enter into the question; although I made a number of calculations in the early part of this case based on the law discovered by poissieullian; nevertheless the calculations did not seem satisfactory, and gave variations from the actual discharges at Cucamonga Springs, as high as nearly twelve hundred percent.

The Court: What is the matter that the witness is now referring to?

Mr Haskell: I asked the witness on Friday, as to whether in the report referred to, the experiments reported did not show that the issue of water from a given orifice, increased according to the pressure, instead of according to the formula which the witness stated to be the correct one.

I did not understand that to be your question; I understood you asked me whether it did not increase faster than the pressure.

Q Yes; that is correct. This difference which you say exists in the Cucamonga plains from the law as found in tubes, occurs according to your notion from the fact that the water is not absolutely in contact throughout from the mountains to the Red Hills, but comes shifting along in different layers?

A No, that is not the reason; the reason I say that does not occur is that when you make a test of that kind in the laboratory, in a glass tube or brass tube, the walls of the tube are impervious to air, and although you attempt to exclude all the air from your sand by pumping it out, nevertheless there is some air remaining, the same as when you throw water out of a cup there will be drops on the inside of the cup, and the air will adhere to the inside of the tube; as long as your pressure applied to the sand does not amount to more than 15 pounds to the square inch, that air does not compress; but if you apply a very high pressure of water, which is greatly in excess of that, it compresses this air, and compresses it against the grains of sand, and into the voids of the grains of sand, and against the sides of the tube, and thereby increases the area of cross section for the flow of water; and the apparent discrepancy is explained by some authorities in this way; and other authorities explain it in other ways which I have referred to already.

Q Well, I think is sufficient on that account if you are through.

A I am through with the answer to your last question.

Q This morning you said that if Mr. Frasier testified to certain things you disagreed with him: now in order to un-

derstand fully whether you understand the matter referred to, I will read from the transcript in this case, page 3071, beginning with line 23:

"Q So that a shower of two inches up there flushed up the Lucie tunnel right away?

"A The shower of two inches of water supplied the necessary fluid for the artificial sharging of large areas in the mouth of the canyon, and that supplied the water which soon after made its appearance or its influence felt on that tunnel.2

Now, I will aslso read from page 3073 of the same transcript beginning at line 10:

"A The rainfall of two inches or more, spread on the gravels near the mountains would change the hydraulic head somewhat, and make a difference in the runoff of the tunnel;it don't make any marked difference, but in a few days if you examine the measurements you will see that after a large amount of water was spread in the canyon, you will find there was a small increase in the discharge of the tunnel, which represented a change of hydraulic head, and that is all there is in it."

Now, do you disagree with that?

A If you interpret it the way you did this morning, I certainly do; but I don't know as that is capable of that interpretation, some parts of it at least.

Q Do you disagree with the statement of Mr Trask that these run-offs in the upper part of the Cucamonga basin are felt in the Lucie tunnel within a few days? according to the

[illegible] [illegible] [illegible] [

measurements?

A If that is the statement of Mr Trask I do disagree with it; if he meant on the other hand that the distributing of water at some lower point would help the tunnel quickly, then I would agree with him; if he means the mouth of the Cucamonga Canyon, and not the canyon at the Red Hill, or anything of that kind, why then I would disagree with him.

Q Well, take it at the point where the testimony shows the water was distributed by the defendants.

A Well, that has been all the way down to 16th street; that would be a different proposition.

Q Do you think that water distributed at 16th street would show itself in the Badlo tunnel?

A No, I don't; there might be some point where it would show itself quicker than others; not having given the testimony myself I cannot tell what point Mr Trask had in mind; I am not capable of explaining his testimony; I have given my own ideas in my own way, and I cannot be responsible for other witnesses as to the way in which they expressed their ideas.

Q Did you draw this diagram (on the board) on a sheet of paper?

A I have not done so; no, sir.

Q I think one of the last questions I asked you was this: suppose that by sinking this well to a depth of 600 feet, a product of 100 inches of water was obtained, whereas when the depth of the well was only 200 feet, only 20 or 30 inches was obtained, how far laterally do you think the effect of the pumping operations would be felt?

A Now, Mr Haskell, there are some elements of that which will have to be supplied, before we could even discuss it; first, whether you were applying more power to the lifting of the water; second, whether you were lowering your cone of depression or not; third, whether you were confining yourself to the same body of homogeneous body of gravel and sand, or whether you were speaking of the whole country.

xQ Well, I will say that the cone of depression is lowered ten feet, and that power enough is put on to lift 100 inches.

A Are you also assuming that it is in the homogeneous formation, without any barriers between the different portions of it?

Q First we will say that it is in the homogeneous formation, such as you say that the 16th street wells are in?

A If it is such a formation as that it will have some effect for a considerable distance; if the formation is fully saturated the effect will be felt at all parts where that same formation is open and saturated. But as to the exact distance that it would be felt I would be unable to express an opinion, without further explorations and investigations than we have available on the 16th street wells.

Q You have no opinion then how far it would be affected laterally?

A I have no opinion, on the 16th street wells, as to how far it would be affected laterally; the only opinion I have there is that I have been unable to find any influence between the Haskell wells, and the wells from 1 to 5; and I have been able from the measurements to observe a probable sympathy between wells 1 to 5; now that is the only limit

of which I have any knowledge, and beyond that there are no experiments or test holes or data, ~~from~~ which to base an opinion, and I would not very well be able to express an opinion as to the subject any further than that.

Q. Would not the quantity of water taken from the well enable you to make some theoretical answer to the question I have asked?

A. No; because your waterplane is sharply descending, and the effect will be different on the up-side and down-side, on a sloping waterplane.

Q. Now, in boring the 16th street wells they came at the lower depth penetrated coarse strata have they not?

A. They have - the number 1 well is the only one I know about, and that went through coarse strata all the way down except with a lozenge now and then of clay in it.

Q. There were coarse strata found at the bottom of those wells weren't there?

A. Well number 3 ended in a coarse stratum of boulders and gravel at the bottom.

Q. Now, that being the case, the inflow of water into that well would be greater in the coarse strata than at any other point?

A. The deeper you are in the coarse material the greater it would be because the head on the inflow is greater.

Q. And the lateral effect of the inflow of water into the well would follow the line of that coarse strata would it not?

A. The lateral effect would not follow that line on a level, but it would be more sharply pointing to the side, to the

one side, than if it were higher up, so that drawing the deeper levels interferes more with the effect ~~of~~ the water-plane below the well, than it does if you are drawing from a higher level; it does not have so much effect on the waterplane above the well, because in the direction in which the stream or percolation is coming in, a well does not affect the waterplane very much, if the waterplane is sloping very rapidly towards the well.

Q The difference between the [illegible] inches and the 100 inches had to be obtained between the 200 foot level, and the 600 foot level, didn't it?

A It had; and as I say would mostly affect the waterplane down the slope from the well, because the voids made above are refilled, and it sets up a greater resistance, so that the water-plane is not so sensibly affected above the well as it is on the down side.

Q And in the furnishing of the supply of that water, we will say for a month, do you think that the waterplane itself at the ~~xxxxx~~ surface would be appreciably lowered?

A At what point?

Q At the point near the well? Not far distant from it, near the cone of depression?

A It would be in the cone of depression; wherever the surface is lowered that would be in the cone of depression.

Q Well, the cone of depression is not what furnishes all of the water is it?

A No, sir; the water is furnished by the hydraulic head above the cone of depression, and the area of the well.

Q And the quantity or volume of the cone of depression,

might be only a small part of the entire volume or quantity of water taken out? Isn't that true?

A The volume of the cone of depression has nothing to do with it; the proposition is that the cone of depression merely indicates the amount of hydraulic head required to furnish water into a cylinder of that length.

Q Now, we will suppose that in this number 3, that you refer to as having a coarse strata at the bottom -

A Yes, sir; number 3.

Q That that coarse strata in fact led to an outlet of the Cucamonga Springs, it would have to be about 3000 feet to the south wouldn't it, it would extend about 3000 feet to the south to get to the Cucamonga Springs, would it not?

The Court: Did you say 2000 or 3000 feet?

Mr Haskell: 3000 feet approximately; it is a mere approximation.

A It seems to be between 2000 and 3000 measuring on this Exhibit E, from well number 3 to the Cucamonga Springs.

Q You measure at the end of the pipe line, or intake of the pipe line that you refer to at weir number 8?

A I was endeavoring to measure to the intake of the pipe line, and to the mouth of the Y tunnel, not to where the weir 8 is, but to the intake of the pipe line.

Q Now, suppose this lower strata did in fact feed the Cucamonga Springs, and led to it, the extraction of 600 feet for the core of this well gives a freer movement up to the surface than would be found in the lower strata feeding the springs, isn't that true?

A Well, yes, it would be diminished; or in other words I

mean to say that the pressure at the Cucamonga Springs under that assumption would be decreased, exactly to the amount of the depth of the cone of depression, and the Springs would then be affected by a decrease in volume, corresponding to the head which has been diminished by pumping down to the bottom of the cone of depression.

Q Now, isn't it a fact that it would be greater than the cone of depression?

A No, sir; not on any theory that I understand.

Q Isn't it a fact recognized by authority, that you can pump large quantities of water from any given well, and still not appreciably or correspondingly lower the water in its neighborhood, in the proximity of the well?

A Now, you are talking about another problem; you were talking originally about the close connection of the coarse material to the Cucamonga Springs, and this was the head which regulated the Cucamonga Springs; I was answering that; if you change to this other proposition then I agree with you,- under many conditions you can pump a well, and pump large quantities of water out of it, without sensibly affecting the waterplane, because of the basin is very large the water-plane will be affected but very little, as time goes on.

Q There is a cone of resistance in the supposition which I have made, leading from the bottom of this well 600 feet deep a distance of approximately 5000 feet, to the Springs, is there not?

A I understand that you say there is both a resistance and a relation by correspondence; I understand your assumption to be that the pressure of the water-plane at the well

is acting on the springs through a coarse and connected medium.

Q And the well at the bottom in this coarse strata draws directly from the coarse strata through a free passage 600 feet deep, whereas, if it pursued its original course, it would go by friction some 5000 feet,- isn't that true?

A Replying again on your assumed premise, I would say that is not true: that the effect is that we take off on that coarse stratum through which you assume the water to pass just the amount of head which your cone of depression has lowered the waterplane at the well, and nothing more; although youmare drawing from the waterplane and drawing water much below that point, the head which is exerted in forcing water into the well is exactly the cone of depression and no more and no less.

Q Didn't youdraw these curved lines on this diagram, at the left of the well, representing the lateral effect, when you testified in cross examination to Mr Britt?

A I did; and I drew those for the purpose of answering Mr Britt's assumption that the cone of depression did not lower the water plane that much, and in explaining that a little further I happened to say that while water moves into the slits of the pipe and exactly in that direction, the fact that the water stands outside to the bottom of the cone of depression, still leaves that much head as working effectively on the springs, assuming the springs to be in that same vein.

Q Now, I read you from page 300 of the Principles and conditions of the movement of ground waters, by Franklin

Hiram King, etc., issued by the Department of the Interior, United States Geological Survey, in 1899, the last four lines on page 355: "The drop in the water level in the wells shows the change in pressure of the water in the surrounding soil, and does not necessarily indicate a change in the position of the water table."

Do you recognize that as principle true in hydrostatics?

A I do; that is what I have stated: that the drop in the water level in the wells, which means the cone of depression of course, only another way of stating the cone of depression, shows the change in the pressure of the water in the surrounding soil, and does not necessarily indicate a change in the position of the water table; that is, the general water table of the valley; I consider the words "drop in the water level in the wells" to be synonymous with the cone of depression, when you are pumping, and that affects the pressure in the surrounding soil to that extent, but that it does not indicate the position of the water table at any other place.

Q Suppose that there is a strata of porous material deeper down than his 600 foot well, and passing beyond it, we will say half a mile, because you say you don't know how far this cone of depression reaches out, you can't tell anything about that, we will say passing it half a mile, then this cone of depression would not at all affect the feed of this lower strata to the springs would it?

A It would affect it to the extent of the depth of the cone of depression, changing the pressure on that stratum by just that much; it would affect it no more nor no less; and that

is in accordance with the principle you read from that report.

Q Do you mean to say that the cone of depression or the water table counts, on the pressure of the water in the springs?

A The cone of depression counts in the Springs, not the water table, if the Springs are connected with this well; I am assuming that ofcourse, because you are assuming it.

Q Now, you say you don't know how far that cone of depression reaches: You have no theory on that: Suppose this cone of depression only reaches 500 feet, or we will say 1000 feet from the well itself; the water table beyond that would still be approximately at the same height as it was at the well itself, before you started to pump: Now, can you say that that water table as it stands between the well and the Springs itself does not still exert its influence on the Springs?

A I can; and I say that in accordance with just what you read in that report; that the head above the lowest point in the cone of depression is all exerted in forcing water into that pipe, and that that head can only perform its work once, according to thewell-established principle of the conservation of energy; you can only expend energy once; when you have once expended it it is gone, and you have to conserve it over to re-expend it.

A You say the watertable is the measure of pressure?

A No, sir; I say the cone of depression is the measure of pressure. You may have said that but I didn't.

Q Does that extend clear to the foot of the Cucamonga Mountains?

Is it possible with the quantity you used that every, or do you mean to say that the time determining or the water bath method, on the question of his water in the spring?

A. The case of depression exists in the spring, not in water bath, if the springs are connected with this soil; I am speaking that different, because you are attaching it.

Q. Yes, you say you don't know but that point of depression results: You have no theory on that: Suppose this case of depression only reaches 500 feet, so we will say 1000 feet from the well itself; the water table beyond that point will be approximately at the same height as it was at the well itself, before you started to pump. Now, can you say that that water table is in equal balance for well and the Springs itself does not will exert its influence on the spring?

A. I can; and I may add in accordance with just that you read in that report; that the last Artesian Tower point in the cone of depression is all results in having water into that pipe, and that that tower only carries the water according to hydrostatic principle of the connection of water; you can only account water; once you have reached it it is gone, but you may be interfere it over in re-supply it.

Q. Can any the saturation in the channel of pressure?

A. No, sir; I say the cone of depression in the channel of pressure. The way lines will cut the I think.

Q. Does that extend clear to the line of the Artesian Tower-line?

A No, sir; it does not; as I was explaining to you, and as is explained by the diagrams in the same report, where the feed comes in from the other side, that destroys the effect of the cone of depression on the upper side of the well, in a sloping waterplane.

Q And at the same time you say it won't shut off the feed to the Cucamonga Springs?

A I said it would to the depth of the pressure exerted by the cone of depression but no more and no less.

Q You say the water table has no effect?

A I say that on the lower side of the well, if you are pumping, the water table has no effect on lower springs; and on the upper side its effect is influenced; it does not make any difference how many miles away, the fact remains that the pressure is only altered to the extent of the depth of the cone of depression and no more.

Q And it would be that way, if you bored a well clear down to Rincon, wouldn't it?

A It does not matter where you bore the well, as long as you are in the same plane of saturation, the cone of depression diminishes the hydraulic head on springs coming out in the same plane of saturation lower down, by exactly the amount of depth of that cone, and that is why in making my diagrams in this case, I have recognized that principle, and used the well elevations, regardless of whether they are pumped or not pumped, because as a matter of mathematics the cone of depression is merely a hydraulic head, which is forcing the water into the cylinder constituting the well.

Q You recognize that the testimony in this case shows in-

variably that whenever the Eadie tunnel bulkhead is closed down in part, whenever the 16th street wells cease pumping, that the Cucamonga Springs begin to flow more? Don't you recognize that fact?

A I do not; the testimony shows exactly the contrary; I made two diagrams here which are in evidence, showing that the closing of the bulkhead, and the opening of the bulkhead in the Eadie tunnel did not affect this well number 3, and the diagrams are made from the figures and the testimony here, and show that well number 3 was rising all the time, when the discharge from the bulkhead was increased, and also shows that the rise was no different when the bulkhead was closed. You remember those two diagrams which I exhibited here.

Q I am not asking you the cause: I am asking you if the evidence does not invariably show that when the 16th street wells stopped pumping in the fall, when the Eadie tunnel is closed in part, that if the Cucamonga Springs don't then begin to increase in flow, and continue to increase all winter until the pumps start up again, and the Eadie tunnel is opened up?

A In reply to that I will simply have to repeat what I said once before, that whenever you base a theory on only some of the facts, namely - you have here in evidence the times at which the 16th street wells were pumping, but you have not in evidence the times when other wells were pumped there,- the wells of the Cucamonga Water Company were not observed by the plaintiffs, and shown in evidence as to when they were pumping, except during 1908; during 1908, on plaintiffs' Exhibit 78 are included all the wells, both of the Cucamonga

Water Company and the 16th street wells, and that year it showed that the drop had commenced before any of the San Antonio Water Company's wells were pumped; I say if there were any previous coincidences, that that would destroy all the effect of those, and would show that the former effect was either due to climatic conditions or the interference of other wells or other causes, to which they have not been attributed by the experts of the plaintiffs.

Q Or else tat the men that measured the water made a mistake.

A No; we do not say there is any mistake in the measurements; we assume the measurements are correct; but we say you cannot base any theory on two factors, when there are a multiplicity of factors entering into the problem; and that I believe has been fully demonstrated by plaintiffs' Exhibit 78, and defendants' Exhibit O, ~~in~~ a number of instances in which the coincidence was incomplete , as I pointed out in my examination in chief.

Q At the beginning of what you call the pleistocene, the glacial period of the ~~tertiary~~ quaternary period, how high do you say those mountains were north of the Cucamonga plains?

A I am taking the evidence as that given by authorities and observed by myself, that in a general way those mountains were something like half the present elevation, or two or three thousand feet lower than they are now.

Q And then during the Champlain period they went down some lower?

A They went down somewhat lower; there was a coninued

Baker Company and the Lake Street mills, and that you it seemed that the time had presented. Before any of the Atlantic Cotton Company's mills were opened, I say it there were any previous negotiations, that, that would destroy all the effect of them, and would make that the lowest effect was either due to atlantic conditions or the indefiniteness of what mills it would open, to which they can not be attributed by the reports of the plaintiff.

Q. To what has the non-lock industry the delay been a disadvantage.

A. Why we do not say there is any obstacle in the manufacturing; we assume the consumption are entirely but, by any you cannot tell any thing about the future, that there are a multiplicity of factors entering into the printing and lack of ability has been fully demonstrated by plaintiff's witnesses, and defendants' witnesses, as a factor of business in, and the manufacturers are interested, as I pointed out in my examination in chief.

Q. Is the beginning of work you call the printing, the glazed period of the bleaching machinery period, the bleaching or you say these processes, are parts of the bleaching plants.

A. It is taking the raw cotton as it has been in storage and delivered by wagon, that is a general and these processes are something like half the quickest elevation, or the or there otherwise that have been also they are one.

Q. And that during the Complaint period they work more than twenty.

A. They work more regular hours; there was a period

subsidence.

Q Now, I want to ask you if you agree with this authority, Dana, page 941:

" The two earlier periods, the glacial and Champlain, have their more prominent characteristics displayed almost solely over high latitude regions; they are not represented in tropical latitudes, or in warm temperature latitudes, south of the parallel of 35 degrees, except locally about regions of lofty mountains"-

Do you agree with that?

A That is a substantial statement of the condition, and they were represented in this region because this was in the region of lofty mountains.

Q You say it was?

A As elevations then were considered, the elevation of San Gorgonio and San Antonio peaks were very lofty mountains; the only higher mountains in California were in the Sierra Nevadas, where Mt.Whitney, and surrounding peaks, are now located.

Q You have been employed and paid a fee by the defendants in this case have you?

A I have, Mr Lashell.

Q How long have you been in their employment, working up evidence and facts in this case?

A Do you mean how much time or how many years since I was employed?

Q How many years?

A Well, I was employed in the year 1904 to go into these matters; I devoted a few days that year, and a few days in

the year 1905; in 1906 I did nothing in this case, and since then I have devoted some time in 1907, and 1908, until the time of this trial.

Q What per diem do you get?

A I receive for all work that I do for this company, $25 per day, and all my expenses. I wish to state that I made this company a special rate, as my usual charge is $50 a day; but they are old clients, and I made them a lower rate than I ordinarily do now.

Mr Haskell: I withdraw my request at this time to have the diagram copied into the record from the blackboard, in the shape it is in now.

Mr Britt: As far as I am concerned, I think we have sufficient diagrams in this case, without adding another one; it may be desirable to have it in the record, but not sufficiently so to justify reducing it to paper, and filing it.

Mr Goodcell, Q You spoke a few minutes ago about the 16th street wells being in a homogeneous formation; you did not mean that any of that gravel bed is a homogeneous mass in a strict sense?

A No; I meant by that merely that it was as distinguished from the ancient alluvium, very much more generally coarse; while it is in the ordinary sense of the word homogeneous, owing to the presence of finer stringers and lenses and lozenges, as well as coarser intermingled with the finer ones, it is not strictly so, but the higher preponderance of the coarse lenses and patches over the finer ones, makes it more homogeneous as a conductor of water than the ancient

this year 1890; in 1891 I did nothing in this line, and since then I have devoted my time to 1892, and 1893, until the close of this trial.

Q. Then you claim do you not?

A. I claim for all work that I do for this company, and for any, and all my services. I also do state that I make this company a special rate, in my usual charge in my day; but they are all alike, and I make that a lower rate than I ordinarily do so.

Mr Dodge: I withdraw my request at this time to have the original copies made by yearly type the plaintiff, in the shape in is in now.

Mr Dodge: As far as I am concerned, I think in this difficult business in this case, without doing anything, if any is desirable in here it is his request, but as self-evidently as to justify reducing it to paper, and filing it.

Mr Dodge: - Do you make a distinction sir, about the first with this, is a homogeneous formation; you do not mean that any of that gravel and is a homogeneous case in a strict sense?

A. No: I meant by that merely that it was so intermixed from the material alluvial, very much more generally mixed; while it is in the efficacy work of the river homogeneous, owing to the pressure of flow, although one finds and footage, as well as material intermingled with the flow sand, it is not equally so, but the higher pressures of the water lower and quieter over the flow sand, which is more homogeneous as a formation of water than the material

alluvium.

Q And in speaking of the effect of the cone of depression in the pumping of a well, I understood you to say that had a greater effect where the well is sunk in a locality where the water is traveling on a grade, the cone had a greater effect on the down grade than on the up grade?

A Yes, I stated that; and that is because the waterplane itself is moving towards the well, and that obliterates more or less the effect of the cone of depression above the well, and that not being the case below the well, the full force of the cone of depression is exerted down the plane of saturation.

Q Now, isn't it a fact that the water moves more rapidly, on the steeper grade?

A Well, yes, that is usually the fact, except in very close formations, where the water supply is extremely scant the grade may assume a steep slope, owing to the lack of porosity and practically the lack of any movement, like in an earthen dam; you take an earthen dam, and in the dam itself the water may stand but not move, and if you take the waterplane of that standing water you will have a deceptive condition as to the movement of the water; in other words if you are considering the effect of the slope of the waterplane, you must also take into account the character of the material whether itbe coarse or fine, in order to determine the slope of the water plane.

Q Well, now take this diagram on the board: Suppose this represents the grade of the waterplane; suppose we put our well down here, and say we are pumping from this depth: isn't it a fact that the cone of depression will reach further

from the well on the upgrade than it will on the down?

A No, sir; it will not, because the rapid accessions of water in that slanting waterplane tend to obliterate the cone of depression, and it does not flatten out like it will on the down stream side, where there is not a supply coming in, which tends to build up its outer rim. That is illustrated here in this report that Mr Haskell has referred to, by diagrams of the wells and their cones of depression.

Q Isn't it also true that where the material from which the water is drawn is not entirely homogeneous, but that there are coarser and finer stringers and channels and deposits, that the rim of the cone or the limit of the cone of depression might not be uniform, but might stretch out more in one direction than in another, and make an irregular draft on the water?

A That is true; that the amount of friction required to force water to a certain level, or under a certain head in one direction, varies with the kind of material; therefore the water will have to stand higher in the finer formations around a well in order to maintain their equillibrium at the cone of depression than they will at the coarser formation; a cone of depression has therefore a wrinkled border in ~~homogeneous~~ heterogeneous material.

Q I have always understood,- I have understood for a good while that the effect of the cone of depression would be more marked upstream than down.

A That would only be so in cases where the wells are drawing from veins under heavy pressure,- in channels; all that we have been talking about as I understand it, is in a plane

of saturation, which is percolating down, and not in a vein or channel under pressure.

Q I want to call your attention to a portion of your testimony, that I will read from the case of Barton vs. the Riverside Water Company, the same transcript from which Mr Haskell read to you, beginning on page 1928, 1929, line 26, going back to that point to show the connection, and to show what waterplane is being referred to:

"Q As you first knew this basin below the dike, what was the depth from the surface to the waterplane?

"A In many places the waterplane was right at the surface.

"Q It varied from that to what?

"A It varied from that down to a depth of something like , the very extreme place would not be over five or six feet.

"Q The surface was undulating or varying?

"A The surface was undulating; yes, sir; the water plane was practically level.

"Q Now, these debris cones which are formed at the well of the pumping plant, which lies upon a declivity, that is to say upon some grade, such as that has, does the debris cone extend uniformly in all directions from the well, for instance upstream is it the same as it is down stream? "

I will say that the term debris cone as used there, evidently should be cone of depression; that is evidently what is meant.

"A Upstream the effect is greater; it extends further

"upstream than it does downstream, but it does extend in every direction.

"Q The gatering of water into such a debris cone at the bottom of the suction of the pump, is that quantity uniform all around, or does it gather more from one side than the other?

"A It gathers the most from upstream, and then from the sides next, and the least from downstream, assuming that the formation all around is the same, but if the formation is different that will affect it.

" The openness or closeness of the material in which the water is lodged, that affects it also, does it?

"A Yes, sir; that is one of the factors."

Do you remember so testifying in that case?

Mr Joliffe: Objected to as irrelevant, immaterial and incompetent, not cross examination, as the basin inquired about in that case, is different from the basin involved in this case.

The Court: Overruled.

Mr Joliffe: Exception.

A Yes, sir; I did so testify, and as you see, that refers to the quantity of water, and not to the spread of the cone, as the amount taken by the pumps is spoken of there.

Q Well, that is one question, but in one of the questions, and it is a general question - I will read that question again, page 1930, line 6:

"Q Now, these debris cones which are formed at the well of a pumping plant which lies upon a declivity, that is to say upon some grade such as that has, does the debris cone

"Someone that it was wholesome, and it have proved to many diseases.

"2. The boiling of water from such a spring has at the bottom of the mountain a cow such, it that quantity sufficient it cooled, or have it gather more from the cow that the water.

"3. It produces the most free quantity, and then from the water with, and the least free quantity when the condition a I assume is the same, and so the quantity is different that will effect it.

"4. The common to characters of the material in which the water is boiled, that affects it also, have it to be, why that not so it the change."

In the summary is satisfying to that boat.

BY ABILYN: Opposed to as irritated, insolent and incompetent, not cross reasonable, as the basis logical about in this case, it different from the truth involved in this case.

VOL Court: Witness.

BY ABILYN: Everything.

Q. Now, why I did or reality, and as you say, that relate to the quantity of water, and not to the speed of the case, as the answer takes if the judge is right or wrong.

A. Well, that is not question, and in but if the question and if is a general question - I will read the question again, page 100, line 4:

"Q. Now, those facts which are learned in the well of a spring first mentioned in your a reality, that is in my opinion and please not in that, that in judge's mere

extend ~~uniformity~~ uniformly in all directions, from the well, for instance upstream is the same as it is down stream?

"A Upstream the effect is greater; it extends further upstream than it does downstream, but it does extend in every direction."

A Yes, sir; and I still saythat what follows shows that what I had in mind was the draft on the plane of saturation below the dike in this artesian basin, and that the water-plane there is in fine sand, which can draw very little water from down stream, and that the main amount of water taken into any well in that basin has been invariably from the upstream side, being due to the local condition that the artesian basin of San Bernardino is spilling over its rim into very fine sand, and a well sunk in that sand, is almost entirely dependent on the flow towards the well from the artesian basin itself, and that basin has no supply except what runs over the rim of the artesian basin down here, on E street below San Bernardino; the conditions there would not be anything like those in the debris cone under consideration in this case, where the water is coming from a general supply in the mountains, instead of spilling over a rim into fine sand.

Mr McKinley: What is it that is being inquired about here? The questions read by counsel from the transcript seem to refer to a debris cone, and the witness now is speaking of the cone of depression.

Q You understand that the testimony which I read was with reference to the cone of depression and not to the debris cone?

moral responsibility in all directions, from the evil, the instance questioned is the same as it is now issued.

"3. Supposes the client is grateful; it attacks further supposes that it does consistent, but it does attack in every direction."

A. Yes, sir; and I will explain what follows above that that I had in mind was the merit on the place of accepting before the fire is this actually state, and that the water-place there is in fact good, which was more very little water from-two client, and that the main source of other water-bodies may well in that there has been irrelevantly from the upstream side, being due to the local condition that the water-main water of the particular is rolling out the fire into stuff from mud, and a well used to that good, is clearly so-tically dependent on the fire hydrants the well from the actuation main itself, and that water is simply enough with from over the rim of the attached main over here, as I stress before the hydrants; the conditions there could not be polluting like stage in the fabric from water contamination in this case, where the water is coming from a general supply in the municipal, instead of polluted over a fire hole fire mud.

Q. Questioning: that is it that is using impaired river water the question that is caused from by disastrously stop is refer to a fabric mud, and the citizens are in spoiling of the fire if depreciable.

Q. You mentioned that the building which I read was with reference to the mass of depreciation and not to the fabric mud?

A I would say so, because that testimony I never read over after it was written out, and probably the reporter made that mistake.

Q Or it may have been a mistake of the attorney in asking the question.

A It appears there that way, as you have read it, but there is no doubt about what was intended; I say you are entirely right on that, and that has nothing to do with the relevancy of your question, and the only thing I make any point on is the difference in conditions between the location referred to, and the location in this case.

Q Wouldn't the difference as between the upstream and the downstream effect be still greater in favor of the upstream in the coarser material, where there was a freer flow of water, than it would be in the finer material?

A Well, I don't think you understand the point I make in my explanation: the point is this: that the conditions referred to in the testimony you read was a spillway in the dike, making ~~xxxxxxfrom~~ the San Bernardino artesian basin; the only water which runs into that basin below there would be through that spillway; there is no likelihood of water coming from other directions; in order to obtain water from a well in the locality referred to you have to place the well as near opposite that spillway as possible, and draw from the direction of the spillway from which the water comes; and that peculiar condition, of water all coming in in one channel, makes the cone of depression affect the upper part more than the lower; whereas, in coarse material like the Cucamonga gravel reservoir, the cone of depression would be

rapidly refilled from above, as the waterplane is very large in extent and general, and not being fed from a single opening in the spillway; and this would tend to restrict the area of the cone of depression on the upper side and increase it on the lower side very much, as referred to in this report that Mr Haskell read, at page 370, where those wells are diagramed in that report.

Q Does it make any difference whether the water which supplies the well comes over what you call a spillway, or whether it comes from the mouth of the canyon?

A Yes; if you assume a position of the well in the fine sand, which is fed from a local spillway through a dike the amount of water is limited, and the question involved is if you put sufficient wells in to take all the supply flowing over the spillway, you have depressed the cone of depression between the well and the spillway, more than any other point and that was the condition which we observed in measuring the water levels down here near Colton, where there was no other water coming in except over the spillway, and that depressed the cone of depression to the top of the spillway.

The Court, Q You have spoken here several times of the spillway: What do you mean by the spillway?

A I can diagram that -

Mr McKinley: Perhaps it would be better to state it without a diagram, so it will go into the record in a shape that it can be understood hereafter.

A What I meant by that is this: take as an illustration the San Bernardino basin, to which this question was addressed, there is a dike which begins in the northerly part

of Lytle Creek, that is so far as croppings are in evidence, and extends across to the mouth of Reche Canyon; but that dike, where the Santa Ana River runs over it, has been cut down, so that a well bored there by Mr Gansner, went down some 70 or 80 feet, and encountered that dike, and ofcourse you could not go any deeper in that cemented dike; that restricted opening in the dike is what I call the spillway, in the San Bernardino artesian basin, the lowest place in the rim of the basin where the Santa Ana River crosses the dike; these wells in question were in the bottom below that spillway; the water which the wells could draw was limited to what could run through the gap, and they therefore drew down the plane of saturation on that side. The testimony which I have given in this case is applicable to the general law of the cone of depression, and the testimony read in the Barton case referred to a local instance which made a very radical departure from the law.

Mr Goodcell, Q In your testimony a few days ago, in speaking of the causes ~~[illegible]~~ that would cause, or contributed to the drying up of the Cucamonga Springs, you referred to the diversions at the mouths of the canyons, particularly Cucamonga, Deer, and Day Canyons, as having caused, or at least contributed to that drying up: There have not been any new or increased diversions at the mouths of those canyons, in the last ten years have there?

A I think there have been increased diversions, without doubt, in the last ten years; that would be since 1899.

Q Do you know of any?

A Only in this way: that when the orchards planted there

became older they required more water, and that the people who owned those water rights have had to resort to every conceivable method of increasing their water supply to supply the needs of the increasing age of the orchard; there may have been some more planting, but probably not to any great extent; the increased necessity has been mostly from the increased age of the orchards; people who had young orchards used to give them three or four irrigations in a season, and now would probably at times give them eight or nine, irrigating for a longer period each year; then also there has been a great improvement in the matter of conducting the water through more impervious conduits, as making a difference in the amount of the diversions; and while I cannot give the names of the parties who have done this, I know that some local improvements have been made along the foothills, by driving small tunnels into the foothills, and setting out orchards along there, both east and west of the canyon.

Q You have spoken about the increased need for water, and the desire for ~~xxxxxxxxxx~~ more water as the orchards got older: but do you know of any actual increase of the supply of water, at the mouths of the canyons, no matter how much was needed?

A No, but in the last years, take some of the years since 1899, in 1902-1903, for instance, was a fairly good year for rainfall, and during ~~that~~ the previous dry period, the orchards had not only passed through seasons of drouth, but they had gained in age, and the owners of the water, like the Loamosa Water Company, would naturally put on their orchards all the water they could; whereas, if the orchards had been young a good deal of the time they would not have diverted all the

water of the stream; they owned the stream; they had used it previously, and they acted on their needs, or what they thought they needed and probably diverted it all; coming on down later, in the year 1904 -1905, which was the realling first good year since the beginning of the dry period commencing with 1894,- during 1904-1905 there was a copious flow from all the canyons; and like a starved man, when he has a good meal placed before him, the orchardists as I might say, made hogs of themselves, and took more than they really needed; they thought they would give their trees all the water they could while they had a chance; that applied to a good many companies that I had to do with in other localities, and I think it applied everywhere; they were just recovering from the effect of a spell of dry years, and would not allow any of the water to run to waste; the fear of another dry year was constantly present, and the effort was "while we have the water present to take all we can",- and that was the general practice throughout the valley, and this locality was I think no exception to it.

Q. But all that is mainly if not entirely a matter of supposition on your part, isn't it? You have not been there and seen any increased diversion of water?

A. No, I could not bring that home as a fact; I am not testifying to this as a fact in that locality; I know where I owned an orchard myself that was the practice which I have made, and that my neighbors in that same neighborhood followed that samepractice; and that has been where I have been acquainted and observed a common practice, - since the dry years, whenever the water was obtainable, to put on more

water than was really needed; and I imply from that as opinion or theory, that if the facts were known here that would be the case here as well as in other localities.

Q You don't know of any other diversion except the tunnel you refer to?

A I don't know of any new constructions for diversions in the last ten years except the small tunnels I speak of near the foothills taking some water for small orchards - tunnels and cuts, and the water used in that manner.

Q Are those developments such as to amount to anything in the amount of water they take out?

A Well, they are small streams, but ofcourse where you begin to collect water in the foothills and use it economically the aggregate does cut some figure in the supply, and to the extent which it has been done, as you can observe by going along the foothills, and seeing the sall ranches that have water tunnels, it has to that extent diminished the supply.

Q Do you know what the aggregate of that amount is, approximately?

A No, sir; I am only speaking of this generally; I have not analyzed this in detail, as Mr Trask was in charge of the detail of the work, and as you see I went out there only two or three times a year, and I kept no track or attempted to keep no track of the minor details.

Q You spoke of two wells, I think close to the Eddie tunnel, that were close together, and they varied very much in the height of the water standing in the well -.the elevation of the water, one of the wells being cut off, and that the water in the other one was still standing at a considerable

elevation above: Do you recall those two wells?

A Yes, sir; I recall them quite distinctly; they were 20 feet apart.

Q Do you know how the water stood in those wells before one of them was cut down?

A I never was there when the two wells were standing at the same level; my observation was that one well had been cut off in the tunnel, and the other well was standing without being cut off in the tunnel, at a short distance below the surface of the ground, and 20,feet away from the well in the tunnel.

Q You spoke of not having seen it when the water stood at the same level; do you know whether it ever did stand at the same level?

A I have no means of knowing; I did not observe the wells before; they might have stood at a radically different level originally; I would assume, from the small amount of water discharged by thelower well, lw would assume that was a fact; I would not testify to it as a fact, but only a deduction.

Q When one of those wells was cut off, cut down into the tunnel, was there a large or small flow from that well?

A There was quite a small flow from that well; it was not a good well; there was no well at that time which flowed into the tunnel more than 35 inches, and the head above it was nearly 90 feet, which we would consider in that condition, if it were in contact with the same well that stood 90 feet above it, we would consider that 35 inches an extremely small flow.

Q Do you know how the two wells compared in depth?

illustration shown: Do you recall their low walls?

A. Yes, sir; I would have quite reasonably; they were 20 feet apart.

Q. Do you know how the water stood in those wells before you or have you not known?

A. I never was there when the two wells were standing at the same level; my observation was that one well had been run off in the basement, and the other well was standing without being run off in the basement, at a short distance be-low the surface of the ground, and Mr. Lewis drew from the well in the basement.

Q. You spoke of not noticing more if when the water stood at the same level; is you have further in your his mind in the same level?

A. I have no means of knowing; I did not observe the wells before; they might have shown at a reasonably different level.

Q. I would suppose, from the good manner of water-divining by believer will, it would appear that was a fact; I would not hesitate to do so a fact, but such a deviation.

Q. When one of these wells was run off, the observation tunnel, was there a large or small flow from this well?

A. Tunnel was quite a small flow from that well; it was not a good well; hardly was my well at that time with flowed but the tunnel were then, in January, and the dual water it was nearly 20 feet, which is well worth in 1884 possibility, if there is another with the water-well-bed around 20 feet above it, we would consider that to follow an extremely well flow.

Q. Do you know how the two wells compared in depth

A I may have the depth in my notes.

Q Do you know whether they were about the same depth?

A They were both deep wells; I may have the notes of the depth in my book; I didn't give that in the other day. I would state that those depths were merely given to me by Mr Stowell; I did not personally measure the wells, and whatever notes I have of the depth of the wells was given to me by Mr Stowell. I will furnish that tomorrow, if I have it, if you wish it.

Q You also spoke of the point in the Eadie tunnel, where you observed the line of demarcation between the old alluvium and the newer deposit, and the dip of it: where was that observation with reference to the foot of the west side of the Red Hill, as it appears now upon the surface of the ground?

A I would have to have exhibit 81, in this case, to locate that definitely, that being a copy of a map which was made under my direction. That point was between the north end of the small red hill, and the west slope of the large red hill, at the point on exhibit 81, marked "branch tunnel", or near the west side of the 90-acre tract; so it was practically between the two Red Hills.

Q How far to the west would it be, from the foot of the Red Hill as appears on the surface of the ground? Ofcourse, I mean suppose you were to strike a line, vertically downward, perpendicularly downward, from the foot of the west side of the hill, at the surface of the ground, how far would that be on a level from the point you mention?

The Court: What do you mean to designate as the foot of the hill? There is a gradual slope there.

a. I may have the depth in my notes.

b. On the lower station they only issued the same weight.

c. Thirty-five feet deep walls; I may have the depth of the weight in my book; I didn't give that to the house doctor. I would think that lower depth were merely given in my or-dered; I did not personally measure the walls, and that-ever notes I have of the depth of the walls was given to me by the Thomas. I will investigate further, if I have it, if you wish it.

d. The floor space of the well, if the walls tumbled, there is several feet of concretion between the wall sections and the rocks dropped, and the dig of the house was lower in-ventilation with reference to the floor of the very base of the well itself, as it rested on the rocks of the ground.

e. I would have to look matters up. In the house. In fact that definitely, that lower a body of a dog which was taken up directly. Good gods, the following day, and of the small red dill, and the next step of the large red dill, at the point of which I, noted "Serious Danger", or over the main side of the Tower Street, as it was practical-ly without the dill.

f. Inferior to the west wall is in from the left of the red dill as appears on the surface of the ground directly, I mean mayors, or more to right a line, vertically approx., pos-sibly directly. From the foot of the west wall to the dill, at the surface of the ground, for the small that is a depth of the water.

The Court: That is you mean to distinguish on the left of the dill. There is a ground edge here.

Mr Goodcell: The foot of the hill as it appears on the surface of the ground.

A Do the hascho lines on the map show it?

Q I don't know whether the Hachos on the map show it or not; I don't know anything about the Hachos.

The Court: Do you mean the lowest point between the big Red Hill and the small Red Hill?

Mr Goodcell: No, sir.

Mr Goodcell, Q The Red Hill extends in a general way northwesterly, and ofcourse it has a slope or pitch to the west, and at some point it strikes the present surface; when I speak of the surface of the ground, I mean the surface of the ground at the foot of the hill,- the point where it reaches the comparatively level ground on the west.

A In answer to that question, I would have to be understood as giving it with a good deal of uncertainty, as not only is the foot of that hill a very illy defined line, but I made no measurements there at the time, and all I could give would be what I find on Exhibit 81; measured from the Hascho lines at the foot of the large Red Hill on that map, to the end of the tunnel, would be as near as I could give it, and that would seem to be between 300 and 450 feet; that is so approximate that it might vary 100 or 200 feet; I am going by this map to refresh my recollection on that point, as I don't remember anything definite about the distance.

Q Assuming this map to be correct in that respect, it would be somewhere from 300 to 400 feet west from the foot of the hill?

A Yes, sir; or practically midway between the foot of the

Q. Do the Bands lines on the sun-dial?

A. I don't know whether the Bands on the sun-dial is so; I don't know anything about the Bands.

The Court: Do you consider Jacob's pillar answers the sun-dial and the world (or stile?

Mr. Dunscomb: No, Sir.

Mr. Dunscomb: A. The sun dial stands in a general lay parallelly, and attempts it has a slope or plane to the west, and it does point at the present moment; that I speak of this surface of the ground. I mean the surface of the ground at the foot of the dial — the point where it touches the horizontally level ground on the west.

Q. In answer to that question, I would have to be somewhat as giving it with a good deal of uncertainty, as not only is the surface of that dial a very dirty surface, but I have no instrument there at the time, but all I would give would be about 2 feet in points at; measured from the plain line of the face of the lodge that dial is that way. In the use of the Journal, would do as much as I could give it, and that would seem to be between 300 and 400 feet; that is an approximate that is right very lately the feet; I am perfectly satisfied to leave it approximation on that point, as I don't remember anything within that the distance.

I understand this map to be drawn in that respect. It would be measure from the to the dial west from the feet of the stile.

Q. Yes, sir; so probably about forty-four feet I am

small Red hill and the large Red hill.

Q At what depth below the surface was it that you observed that demarcation?

A That I can only figure from the tunnel; Mr Stowell stated at that time that it was 80 feet, and I have since verified that pretty closely, and it is certainly somewhere between 70 and 80 feet.

Q You spoke also of the comparison of elevation of water level in the Sadie tunnel, and in well number 3, as affected by the opening and closing of the bulkhead in the tunnel: the elevation, as marking the tunnel water, was made as I understand, at well 14?

A Well 14, plaintiffs' numbering; yes, sir; well number 9 as the defendant, San Antonio Water Company, has numbered it.

Q I understood you to express the opinion that there was no sympathy between those two wells, because when the bulkhead was put in there, the water rose in well 14, much more rapidly than it did in well 3, and when the bulkhead was taken out the water fell much more rapidly in well 14 ~~and~~ than in well number 3?

A I don't think I meant to say that; I think that what I meant to say was that the two diagrams in evidence would show just what I said, namely, that when the bulkhead was closed and the water raised in well number 9, it still continued its accustomed rise in well number 3; and that when the bulkhead was opened, and the water lowered in well number 9, the rise still continued in well number 3, on what we would call a regular curve, as shown by the different elevations.

well that will need the force that will.

9. It must displace the surface one it then, by observed the displacement.

10. That force only flows for tension; or Bernoulli states as long time that it was so first, and I have since verified that pretty nearly, and it increasingly somehow depends on the law of fact.

11. The equal sign of the comparison of elevation of water level in the main tunnel, and in well number 2, is effected by the relative and similar of the bottom in the tunnel: the elevation, as mining the tunnel water, was made in a mathematic, or well bar.

12. Well 1a, physicality' measurings yes, sir; well number 1 as the patterns, the [illegible] Tunnel, the measure it.

13. I mentioned yes to mention the pipeline that there was no connecting pipeline here or file, because [illegible] had the water in there, the water came to well 1a, there was equality then it did to well 2, and also the pressure was the water rise more equality to well 1a and then in well number 2.

14. I don't think I made be my line; I think that that [illegible] my the line for the diagram to reference well. [illegible] I will, sound, look over the [illegible] [illegible] the water issues to well number 2, it still [illegible] the [illegible] that 1; well number 1; [illegible] the [illegible] and the water levels in well number 2, the elevation, well 2, the [illegible] [illegible] well 2 [illegible], [illegible] by the different [illegible].

Q Well number 9 and well number 14 designate the same well?
A Yes, sir. That is, there was no drop in well number 3, then there was a drop in well number 9 of a good many feet, as shown on several occasions.
Q Now, isn't it a fact that when the bulkhead is opened that the draft of water from the tunnel is in the first place from the free water that has been stored in the tunnel and the wells
A Only partly so, because as you take the head off these wells the superimposed water acting as a head to take the water down in the wells, the flow increased; while I would say that part of the draft is from stored water in the tunnel, I think another part is from the wells, which begin to increase their output upon removal of this blanket holding them down; and also from the water saturating the formation adjacent to the tunnel.
Q So far as the water saturating the formation adjacent to the tunnel, the drop of the free water in the well would be or at least might be much more rapid, than the draining of the water from the material around on the outside of the well?
A Well, that would be the same as the cone of depression in a well, that the deepest point would be at the well, and then it would slope out on a regular grade; it would be the same thing as the cone of depression in a pumped well,- comparable to that I should think; and all I meant to argue from the point, or all I meant to assert is that if the cone of depression formed by draining down well 14 or well 3, did extend up to well number 3, that it should cause some drop in that well.
Q Might not it be, however, that the water drained out from the Waste tunnel through the opening of the bulkhead, might

be somewhat in excess of the amount flowing up into the tunnel from the wells, so that it would cause a depression of the standing water in the well, and at the same time the amount of water flowing down to well number 3 might be sufficient to keep that well up, or even increase its elevation, even though the drawing off of free water in the tunnel was sufficient to lower the standing of the free water in well number 14?

A Well, that might be argued, if the wells in the tunnel were not uncapped; but as I know the conditions there the various wells which discharge into the tunnel are not discharged in any artificial opening, and the only capping is the superimposed water which accumulates in the tunnel. By the well known principle of the supremacy of forces the higher you raise that superimposed quantity of water, the less will be the discharge from those wells, and the more you lower it the more would be the discharge from the wells; now, if you lower the water in that tunnel, which is directly in circulating contact with the water in the wells, passing not even through a gravel medium, you at once take off a portion of the head of those wells, equivalent to the depth which you lower the water in the tunnel; when you do so that accelerates the discharge of those wells in that proportion; if those wells were in the same formation or the same channel as well number 3, then the effect on well number 3 should be communicated to that very quickly, and as those wells are artesian wells and in pressure veins, they are not wells in a saturated mass or a gravel basin, but in a vein of water under pressure, and therefore if well 3 were on those same veins and in sympathy with them, the lowering of the head on these artesian wells at the Sudie tunnel would have unquestionably felt on well number 3, and that very quickly.

Q. You cannot determine, can you, from the amount drawn out of the tunnel or through the ~~[illegible]~~ bulkhead, the amount that was actually rising at the time in well 14?

A. You can determine the difference in head. That is, you can determine the cone of depression in ~~the~~ pumped well. Whenever you lower the water in well 14 you are taking off an equivalent amount of head in all the wells in that tunnel.and therefore you are affecting the water pressure to that extent.

Q. But so far as the quantity of water is concerned you ~~are affecting the water pressure to that extent~~ cannot tell what the quantity of water was that was being discharged from well 14?

A. No; you could probably figure that out by taking the hydraulic head as one factor and applying a formula for measuring the wells under different hydraulic heads. But that would be subject to some error by reason of the feed from the formation, and also the feed into the formation when the bulkhead closes.

Q. The varying of the elevation of well 14 as measured at the time of opening and closing of the blukhead was really not the variation of well 14 alone, but represented the aggregate variation of all the wells and supplies that were flowing into the tunnel?

A. Yes; that variation which was measured on 14 applied to every well flowing into the tunnel, because those are all connected at the level of the tunnel, and whatever does lower the water level in well 14 must also lower the water level in all the other wells to exactly the same

amount, because they are just like wells in a reservoir,--all connected into that tunnel and its various branches.

Q Referring now to the gravel deposit lying between the Red Hills and the foot of the mountains, and taking it in a state of nature before any interference by wells or pumping plants, the water saturating a portion of that gravel I suppose even then was in motion, was it not? It was moving water?

A The gravel basin, you mean?

Q Yes.

A Yes; the gravel basin water was unquestionably in very considerable motion before there was any abstraction from it at all, and always moving down the grade away from the mountains in some direction or other. It would move originally as the contours and levels show to the south, and as soon as the dike of the Red Hill made its effect felt that would create a tendency to turn the water from one side to the other. And as the material on the west towards Upland is nvervgravelly and coarse, while the material on the east is of fine texture, the natural result was to turn the water to the southwest through these coarse strata.

Q In a normal state how far north or how near the foot of the mountains would the saturated mass extend? How far would there be saturation?

A That I can't give any definite opinion upon. In fact, I could hardly give an indefinite opinion, because I didn't make myself conversant with the locality at that time and didn't even know the height to the water plane any farther back than 1890 in any of the wells, and all I can venture

on the subject would be to show that that elevation would extent for some considerable distance, but unquestionably would not extend anywhere near the foot of the mountains, owing to the free outlet for the water to the southwest, and to the lack of sufficient inflow from the water shed to raise it and saturate the whole mass to the foot of the mountains when there was a free outlet through which the water could escape after.

Q. Can you state approximately or give any definite opinion as to the degree in which the water plane would conform to the surface placne of the earth?

A. It would undoubtedly be very much lower than the surface plane of the earth, because when we first knew of the water plane in 1890, which was after a period of very wet years and a long period of such years, the water plane was then at well no. 3 somewhere in the vicinity of 30 feet or more below the surface, according to Mr. Trask's testimony, and I would believe that the highest point which that water plane has reached since the rainfall records have been kept at San Bernardino, at least.

Q. Naturally the water plane is on a grade, is it not? It does not stand on a level?

A. Not in this basin. In this gravel basin the water is on quite a sharp grade, caused by the outflow at one side and the movement of water down to the south and southwest.

Q. Under normal conditions is the grade of that water plane as steep as the grade of the surface ground?

A. I would think not. The explorations which have been made in that vicinity indicate that Mr. Trask testified to Frank-

ish and Stamm tunnel and experimental shaft no. 3. and further west I have some knowledge of the Bodenhamer wells, which would indicate that the water plane while at times it might rise to considerable heights at the upper end temporarily after freshets, that that is not water in saturation but merely water percolating down to the plane of saturation. And when the water plane again becomes normal after the freshet season is over, the water plane goes down to a very great depth at that point, as shown by the measurements in the Frankish and Stamm Tunnel, for example.

Q Then youropinion is that while the water plane is natural and on rather a steep grade it is not as steep a grade as the overlying surface of the ground. Q: That is my opinion That it was not on as steep a grade. And when you speak you speak of that water plane, I suppose that you mean the same as I do,-- thesurface of the saturated mass.

A Yes. That, of course, would vary more or less with the quantity of water flowing in above?

A Yes; the water flowing in above I don't regard as part of the saturated mass, because that is brought on spasmodically and finds its way down to this saturated mass; and I doubt if there is ever water enough out on there to saturate that region. The developments have shown that that never was thoroughly saturated, but that the water would run in the isolated channels and gravels in which it could find the most easy escape downward.

Q Might there not be a plane of saturation extending as far north as the Frankish and Stamm Tunnel, or even further and yet be so low as not to be observed or noticed in the

tunnel?

A Oh there might be underneath. There have never been explorations made in that region to determine where the saturation is underneath the Frankish and Staam tunnel. They didn't reach down to the plane of saturation; and where it is at that point is entirely pr blematical.

Q So you can't say whether there was or was not a plane of saturation directly below the Frankish and Staam tunnel?

A I am unable to say. I doubt very much if there is between that and the floor of the valley. And speaking of the floor I mean the bedrock on which the two alluviums are laid down.

Q And water moving through a saturated mass such as that if of course moves the more rapidly with the steeper grade?

A Yes; it moves down the steepest declivity as a general rule, and that is indicated, when you have hydrographic contours, by a right angle movement to the line in which the contours are indicated on the map.

Q Now having that saturated mass with that normal water plane, suppose a well is put down near theRed Hills which would be down towards the lower levels of the water plane--speaking of the surface level--and water is taken out from that well in considerable quantity (say 100 inches) What would be the effect as to lowering the water plane over the whole mass or up to the higher reaches of the plane of saturation?

Q Are you speaking now of the recent gravel basin, or

or of the wells in the artesian formation?

Q Suppose we take the well no. 3 for illustration?

A Replying to that question on that understanding, I can say that, except as modified by the stratification of the debris cone which does have considerable influence on the lateral movement of water, and by the inflow of accessions of water,--free percolating water,-- above the plane of saturation, the effect of such a well would be felt throughout the same general mass from which it is drawing, if continued to be drawn upon for a long time. To make that answer a little more specific, I might state, as has been frequently referred to in my testimony, the laying down of this recent alluvium or recent quternary as I have termed it, has been along the same lines and in the same general way as the ancient, the distinction being one of density and age more than mechanical construction. And such a distinction as that would to some extent modufy the lateral influence east and west. But I believe that a well like well no. 3, put down in that recent gravel basin, will affect the elevation of the gravel reservoir to the north as far as the saturation from that well extends, in a complete manner, terminating only at a point where there is a lack of complete saturation or water percolating in a state which does not completely fill the pores of the formation, because water which is not sufficient in quantity to fill every pore in the formation so as to expel the air and fill every capillary and gravity void, cannot communicate pressure to the waterplane. You have to wait till the water has actually reached the permanent plane and filled every pore be-

fore the effect can be felt on that water.

Q. That plane of saturation does extend at least to some considerable distance to the north?

A. It extends unquestionably a varying distance to the north. I suppose that in dry years that northern extension is curtailed by lack of accessions from above. After a cycle of wet years has had time to exert its influence, that plane of saturation will extend further to the north and rise higher than after low years in supply.

Q. And when water is taken out of that well wouldn't the effect throughout the plane of saturation be quite rapid and be felt in a very short time?

A. It would, except for one condition which exists in this locality; and in answering this question I mean by the plane of saturation a completely saturated mass. And that condition is that there is a very large discharge from this basin through the outlet to the southwest; and the putting down of a well near that outlet has only a little greater effect on the outflow than a natural outlet has. In other words, you are to some extent intercepting water which is already well on its way to that outlet, and by so doing the injury to the plane of saturation is not so great as if you came further up the plane and took out water which has not reached a point near the outlet. And that theory is predicated on the assumed state of facts and the facts shown in the testimony in regard to the water flowing to the southwest, that the water at that point would soon have passed out of the basin at any rate; and when it has once passed down any considerable distance into the

outlet, it is lost so far as the actual basin is concerned. It simply tends to keep up the level in the outlet.

Q At the same time, if you do draw 100 inches from that well, it creates a cone of depression at that point?

A It does.

Q Wouldn't that result in an acelerated movement of the water throughout the entire plane of saturation?

A Yes; it would result in that and one other thing: It would result in drawing back some of the water which is percolating with considerable rapidity towards the outlet, and to that extent would act as a conservator of water. But so far as it creates an artificial draught on the side of the well above which the water plane slopes, it depletes the water plane. And what I wish to be understood as saying is that a well located like the 16th Street well does not deplete the water plane to the full amount of its draught, because it is drawing water which has passed to the outlet as well as water above which has not yet gone there and therefore becomes an actual injury or depletion to the water plane only to that extent.

Q I suppose you cannot form any definite idea of the proportion between theupward and the downward draught?

A No, you can't form any definite idea. But I suppose the proportions are not far from equally divided; because while you have a cone of depression as a circle of 360 degrees, and if you draw a line normally to the water plane through that circle, (that is, I mean, level to the water plane) you don't have to assume that half of the circle is on each side; but you do have to assume that water comes

in from each half of he circle. The only error in dividing the water equally is due to that assumption. It may be that more comes in from one side than the other. That is modified by local conditions. And were I to make any estimate, half of it would be the depletion and half of it conserved water which otherwise would go through the outlet.

Q The water taken from that well wouldn't run up hill to that well, would it?

A No; it is not that. It is the same proposition that Mr. Haskell and I had on the blackboard diagram, namely, that the outflow from the basin is just the same as he likened to the spring. You are cutting off the water which is moving toward the lower half of the circle towards the outlet, the same as in his assumption it cuts it off from the spring, and to that extent it is conserving water which would pass down to another basin, while on the other hand, the water on the other side of the well is an abnormal and an unnatural draught on the water plane.

Q Don't you think that a very much larger proportion of water would be drawn from the up stream side, as we may call it, on account of the increased elevation or what you may call the greater head above than what there is below?

A I have no doubt but what it would, referring to the absolute quantity, and that that is precisely correct. But you must recollect there was also some water going through that slope before your well was in there, and yet, when you sink your well and make a cone of depression, you are merely accelerating that slope sufficiently to give you the quantity which you say might be half, of which you are

depleting the water plane. That is particularly well illustrated by sinking two wells in the water plane close together, and one above the other. You will find sometimes that the upper well takes half of the supply of the lower. The illustration on page 370 of this report called movements of ground water by F. H. King and theoretical investigation of the motion of ground water by Schlichter, gives a diagram which illustrates that, showing how a well on the lower side is affected by taking water which is on its way out, by means of the well above it-- in the direction of the movement of the water in the water plane.

Q The elevation of that water plane depends, does it not, upon two things: the supplies of water and the degree of resistance to the free passage of water in its downward course?

A Through the outlet of the basin?

Q Yes.

A Yes; those are the two things which govern the amount of water at any time in the basin, as well as the slope of the water plane.

Q If the water which now flows and percolates through the gravel were flowing in an unobstructed channel on the surface of the ground, it would all flow in comparatively small channel, wouldn't it?

A Yes; that would occupy only a narrow channel and would not be, if it were averaged, more than half of the supply which I figured to the two alluviums. it might be a little more than half the supply or a little less, as we cannot divide the water between the two alluviums to any fixed

degree.

Q And it could all be carried in a good sized pipe line?

A Yes, sir; in a pipeline of quite moderate size on that grade.

Q So that the reason that the water is backed up or the reason that the waters cover so large a cross sectional area in its forward movement is because of the resistance which it meets. causing it to flow so slowly?

A Yes; and going still further back , that resistance is attributable to the texture of the recent gravel as well as the restricted cross section at which the outlet is located.

Q So that anything that increases the resistance increases the elevation of the plane of saturation, even though the supply remains the same,

Q Yes; if you narrow up that outlet in any way or cause its formation to become more dense by filling the interstices with any material that would have a tendency to raise the water plane without diminishing the output.

Q And the reverse would be true, that anything which would lessen the resistance would lower the water plane, and anything that would lessen the resistance in that outlet, either by placing wells in it or near it, or by any other operation which would cause a free flow through it, would undoubtedly make a greater draught on the plane for a distance back to be lowered; and that distance back would finally establish an equilibrium between the resistance and the amount of water traveling through; there would be a balancing of forces.

[illegible]

Q Now if the water be taken from the bottom of the well, say at a depth of five or six hundred feet, instead of being taken from the surface? Suppose the well was put down without perforations to a depth of 500 feet and the water was pumped in that well to the extent, say, of 100 inches, all being drawn from the bottom of the well: Would that not affect the water plane in the father reaches of it nearer the mountains more rapidly and to a greater extent than it would if the water was taken from a higher level in the well?

A Not unless you abandon your hypothesis that the mass is all saturated. If you still stick to that hypothesis it would make no difference where you drew the water out of that mass. But should you abandon that hypothesis and come to water in ducts and channels, I believe it might have had its effect.

Q Because if one well pipe was stuck down in a lake it wouldn't make any difference whether you drew it from the top or bottom?

A No; if you have a entirely saturated mass which is only influenced by local lozenges of clay, then the taking of water from any part of the water plane, whether you take it by means of a well 50 or 100 feet deep or 600 feet deep. so long as the quantity of water remains constant, it has precisely the same effect on the water plane and on the cone of depression too.

Q Suppose that the well ended in a stratum of coarse gravel in which there was a relatively free flow of water, and the water was drawn from that stratum, and suppose

[illegible]

[illegible]

[illegible]

that that stratum was overlaid with an impervious or semi-impervious layer for some considerable distance back: would not the effect of drawing water from that stratum be to draw water down much more rapidly and to a much larger extent in the higher reaches of the water plane than it would be w when the water was drawn out of the well at a depth of 100 feet?

A That would be a theoretical question which does not contain sufficient conditions on which to base an opinion; and I wish to state that it would be necessary to add a statement as to whether the clay separation was complete from all the remaining plane of saturation from above and below, and whether it is a local lense or lozenge, and also whether the vein of water in which the well ends is filled to its capacity and flowing under pressure, or whether it is only partly filled and flowing as an open channel.

Q We will suppose that the vein is enclosed with impervious layers and that there is sufficient pressure on it to raise the water in the well from the bottom of the well so that it rises up to the suction of the pump, say 400 feet above the bottom of the well.

A And that the pipe is not perforated elsewhere and that this water does not come from some plane of saturation above?

A Yes.

A That would in a very short time, if the vein is free and open,- it might be within a minute or two-- affect the pressure for many miles.

Q If we have such a vein or duct leading half a mile or a

mile-- say a mile-- northerly from the well, still speaking of the well as being well no. 3,-- suppose we had such a duct extending from the bottom of the well towards the mountains a distance of say one mile,-- approximately one third of the distance and no further-- the duct there ending in the general mass of gravel deposited, wouldn't the drawing of that water from that duct operate in drawing down rapidly any head of water which might be standing above in the head or opening of that duct?

A It would, if you assume those conditions that the duct ends in the completely saturated mass and that you are drawing more than the normal discharge of the duct through its natural outlet by means of a well. It would within a minute or less cause a fall or decline of the water plane and the pressure at the upper end of that duct, the same as we observed in the Katz Walkinshaw, case when the water drawn from the gravel affected it for long distances.

Q And that duct instead of extending toward the mountains a distance of a mile, if it extended only half a mile and there opened into the general saturated mass, would it not then operate to a great extent, although to a less extent than before, to draw down the head of water from the highest part of the water plane?

A There would be quite a marked difference, because the effect, you understand, is felt where the intake to the vein is and where the vein begins to be under pressure. Before it is under pressure the movement is very slow by percolation-- it may be only a few hundred feet a year; but if it

was in the vein, taking out a draft at the lower end of the ~~plane~~ vein means making a draught at the upper end if the vein ~~of the same size at once. This is impossible~~ pressure between the particles

Q And if our duct or vein instead of being covered by an impervious material was simply covered by material that was partially impervious, through which water might pass but pass more slowly than the way the other does, wouldn't the effect be the same in kind though less in degree in the upper reaches of the saturated plane?

A It wouldn't be the same, because if the enclosure of the duct were not impervious it could not be under pressure, and it would then be a question of degree depending on how impervious it was. If it was partially impervious and partially under pressure from some upper sources, with small leaks, it would be like a pipe line. If there were leaks in the pipe line, and if there were some drawn in that way---

Q You don't mean that water could not be under pressure unless it is in a duct that is covered by an absolutely impervious material?

A That is one condition of pressure. The water may be under pressure in a reservoir or lake. Taking a drop of water out of the lake lowers the whole lake that much. If you take a million molecules of water from the bottom of a lake the effect will be to settle the whole surface of the lake, as the molecules may be likened to miniature billiard balls all resting on eachother and there being no medium between them to cause friction, the hydraulic pressure would be instantly communicated to all parts of

the lake and lower the whole level of the water.

Q Suppose we have a pipe line which will carry a definite quantity of water under a 100-foot pressure. The pipe line, of course, being placed on a grade. But suppose that the pipe line leaks-- not enough to take out all the water by leakage, but to allow part of it to escape, so that the water at the lower end of the pipe line would be only under a 50-foot pressure instead of 100-foot pressure. That is a possible condition?

A Yes, that is a possible condition. Q: And the result would be that if the pipe line was leaking so that part of the water escaped as it passed along through the pipe, the head of the water in the pipe would be lowered; the pressure at the discharge end of the pipe would be less, but still the pipe line through part of its course would be under some degree of pressure?

A Yes; it would be under sufficient pressure to deliver what discharge there was at the end of the pipe, considering the length of the pipe and the resistance of the pipe.

Q So a duct or vein of gravel, although it may not be covered by an impervious material so as to prevent some leakage or escape from it, yet if it is covered by material that is relatively much more dense than the material included in the duct itself, wouldn't the result be that the water at the lower end of the duct would still be under pressure but under less pressure than if the covering had been impervious?

A Yes, sir; or more properly stating it, the pressure ends at the end of the pipe or duct where it appears as

free water. And it would mean that the water would emerge at that point under some velocity, although not as large volume as it would have if the entire pipe or duct ~~would have if it was~~ tight. The waste of water would take up some of the friction head. Such a condition, therefore, would diminish the working head on the duct or pipe line, and would diminish the velocity at the outflow as well as the quantity discharged at the outflow, assuming that you are not making any changes in your outflow-- I mean in the character of the outlet.

Q It is a fact, is it not, even in what we call the modern alluvium that there is a variation in the character of the deposits, being some veins of coarser material and other veins of denser material more or less intermingled and mixed, but still to some degree of denseness?

A That is a fact, and is influenced principally by the slope or grade on which the modern alluvium is laid down. If you lay the modern alluvium down on a flatter grade than what we have on the Cucamonga Red Hills, you would have a condition approximating more the ancient alluvium. You could compare, for example, the San Bernardino valley with the gravel reservoir at Cucamonga. The geological age of the two deposits is identical. The San Bernardino Valley was formed in the same geological period when the reent alluvium off here was formed. But they were laid down under different conditions. The grades in San Bernardino were much lighter; and that being so, it would cause a larger amount of fine stuff to be deposited and to form these semi-porous veins; while at Cucamonga the descent was so

rapid that nearly all the fine material would pass down towards the Chino Ranch and there form the artesian basin of the Chino Ranch which is similar to the artesian basin of San Bernardino, and it is also in the recent alluvium.

The Court: You answered Mr. Haskell this morning in referring to the red line which you drew on exhibit P, that the coarser deposit would be above that line, next to the mountains. Do you predicate that on any ascertained facts in that particular case, or the general theory that the coarser material would be deposited near the point of discharge from the mountains?

A It is predicated on some facts in evidence. The Frankish and Stamm tunnel and the grade of the debris cone at the mouth of Cucamonga Canyon, which is very rapid. Aside from those facts, it is entirely predicated on the general theory that the nearer the mountains, the coarser the material.

Q Is there any general law regarding the discharge of coarser and finer materials? The finer is carried the farthest from the point of discharge?

A Yes, sir; that is the general law. After the waters pass out of the canyon they spread out more, and even if they don't spread, the channels are blocked and they are turned more, and the velocity becomes diminished, and as the velocity is diminished the transporting power is diminished, and that process extends down as may be well illustrated at this very locality. Beginning at the mouth of the Cucamonga Canyon we have a gravel deposit and very gradually it becomes finer and finer, and gradually you reach the Chino

basin and the westerly part of the Jurupa Ranch, the Santa-AAna River and Chino Creek, and at that point the deposits are mostly fine.

Mr. Goodcell: Q The 16th Street wells, or those of them as to which you have knowledge, do pass through varying grades of material?

A I only have personal knowledge of one, which is well no. 3, and then I have personal knowledge of Haskell well no. 1 or well no. 7 in this case. The former of these, namely, well no. 3, passed mostly through coarse ~~gravel~~ material but with some narrow beds of partly impervious material, w while the Haskell well no. 1 or well no. 7 passes through a very great amount of finer material.

Q When you speak of well no. 3 passing through narrow portions, you have reference to the thickness vertically, haven't you?

A Yes; we know nothing about their lateral extent, and my reference was meant to be narrow in the vertical plane. And judging by the coarseness of the formations adjacent . my deduction is that those are merely lenses which form in rapidly flowing waters where the streams are curved so as to form an eddy on one side, depositing the fine silts in that eddy.

Q You don't know how far or over what area those lozenges might extend?

A No; only by deduction from the manner in which generally fluviatile currents lay down their deposits.

Q And their greater extent would be lengthwise of the stream in which they were laid down, would it not?

A Yes; usually; although there are times when a sharp bend in a stream will make an eddie on the inside of the curve or bend of the stream. That is a phenomenon which we can observe to-day in the flowing streams from the mountains across the valley.

Q In speaking of the comparison between the elevation of the water in the Haskell well and the discharge of water from the Cucamonga Springs, you have spoken of the head under which the discharge from the springs is made,-- to that discharge being governed by the same proportions to the head or the square root of the head. I would like to under stand, if I can, just what you mean by the head under which the water is discharged at the springs. What is the head of that water?

A What I would mean by the head of that water is the elevation of the water in the vein or veins which lead to those springs; and in discussing this matter of head from well 7 to the springs, I don't wish to be understood as assuming that well no. 7 does have any connection or is connected with the spring. But that was a negative proposition directed to breaking down a theory which I don't believe observations made by myself and the facts justified; and I merely put that in as a synopsis of the various data upon which that theory in my mind is disproved; and that whatever head the springs are under, discharge, in my judgment is in the veins themselves which pass through the ancient alluvium and which have their origin deeper down under the basin in which well no. 7 apparently is a factor. And I might state here that in my judgment Cucamonga Springs

are not fed from a single vein, but from several. It is a complex situation, which passing through the ancient alluvium, these veins would converge, if there are more than one of them, at some point below the mountains, and while there is a p pretty strong element in this case showing that the Y Tunnel and the Cucamonga Springs are on the same vein, it is not certain but what there may be more than one of those veins further east and west than the Y Tunnel.

Q The water from the Haskell well drains down, of course, from some considerable elevation above it in the gravel beds?

A Yes; it does; the Haskell well receives its water from the general reservoir, and may be somewhat comparable to the hypothetical suggestion you made of a duct or vein leading from the general reservoir to that or other wells. Only I think, in my judgment, the lower end of the ducts were closed and that there was no water passing through them excepting after the wells penetrated it and made the abstraction of water.

Q In speaking of the head of the Haskell well, you wouldn't say that that was under a head of 200 or 300 or 400 feet, w would you, because the water drained down to it from that elevation?

A No; the Haskell well is not under sufficient head to cause an artesian condition. And confining myself to well no. 7, I measured the water level in that well at times before it was bored and also after and observed no rise. So the head can't be higher than the surfae water at the well.

Q The water in the Haskell well stands how far normally below the surface of the ground?

A It did stand about 61 feet before the boring of the deep well commenced. The figures are exactly given in the transcript in my former testimony. Within a small fraction it stood about 61 feet from the surface. After the boring was completed ~~they~~ had fallen slightly. That is, the water was not as deep as it was before. But I don't attribute that to any condition encountered by the well, but merely to the natural decline of the water plane, as it was declining in some degree during the dry years; and judging from those facts, I have predicated my opinion on the assumption that the Haskell well had no more head feeding it than the surface water which was first encountered in the shaft, and that it probably had no lower head feeding it, because there was not sufficient fall in the water plane during the boring of that well, ~~presuming that it had~~ to presume that it had struck a vein operating under a lower head.

Q And taking the water in the Haskell well as standing at a depth of 61 feet below the surface, how would the elevation of that water compare with the elevation of the point of discharge of the Cucamonga Springs?

A It would be considerable higher. I am unable to state without making the calculation necessary to reduce 61 feet or whatever it was to sea level, but it would be higher than the lowest outflow of the Cucamonga Springs. I won't say that it was higher than the highest appearance of water in the springs. I never examined to determine that factor.

Q Suppose that we could run a pipe line from the point of

emergence of the Cucamonga Springs to the Haskell well, and tap the Haskell well at a point say 70 feet below the surface: Wouldn't the water from the Haskell well run off through that pipe line and come to the surface at the Cucamonga Springs?

A You are referring to the present time or early times in '99?

A At the time when the water stood in the Haskell well at 61 feet.

A That would be in '99. If you had laid such a pipe line at that time it would draw whatever water was tributary to the Haskell well above the 70 feet, or between 70 feet and 61 feet-- under a 9 foot head., and deliver that water to the Cucamonga Springs.

Q And then if the Haskell well should be pumped, or for any reason the elevation of the water should fall below the point of 70 feet, the water would cease to flow through that pipe line?

A Yes, it would cease to flow through that pipe line.

Q And the artificial springs would become dry?

A Yes, sir; the springs due to the flow of this pipe line which you have assumed to be laid there would then of course dry up, if you lower the source from which it was supplied and assuming that the condition was tight so that the water from the other soil couldn't enter it.

Q If there were a duct-- a gravel duct-- any kind of a channel that would carry water extending from the Cucamonga Springs up to the vicinity of the Haskell well and reaching the water of the well at an elevation above the elevation

of the springs, that would draw water from the wells the same as a pipe line, only to a less extent? That is, the water traveling through an obstructed passage way instead of an o en pipe line?

A Yes, sir; with this exception: That you would have to place that duct lower than 70 feet, because there was a shaft dug below that depth; and if there was any such duct it would have been disclosed by the excavating of the shaft. The shaft went down all the way in sandy clay, so that whatever duct there was would have to be below the bottom of that shaft, and that shaft I think was-- I think I have the depth of that-- the bottom of the shaft is 103 feet; so that whatever ducts there were would have had to be below that point, because the shaft disclosed the formation down to that point.

Q But if there was a duct that struck that water e en 100 feet below that,-- say 200 feet below the surface,-- so long as the elevation of the water in the well or at the point where the well is was several feet higher than the elevation of the Cucamonga S prings-- even though that duct might be a duct leading down from the springs to the well and strike the well at an elevation below the point of emergence of the springs,-- still the pressure of the water at the well would cause water to rise up through that duct and discharge at the springs, on the principle of a siphon?

A On the principal of an inverted siphon?

Q Yes, sir.

A But there are some facts which disprove that assumption; and while these might be given in re-direct examination, I

will give them now and you will have the benefit of them. I will read some references to the testimony in this record which disprove that contention. Beginning with the measurement which I gave Mr. Haskell the other day and which was only the first one of a number, I will give you the following:

May 20, 1905, water elevation of well no. 7, 1341.7 feet. Page 92 of the transcript.

On the same day, discharge of Cucamonga Springs 6.62 inches, exhibit no. 3 of the plaintiffs.

February 14, 1906, elevation of water level in well no. 7, 1341.7 feet. Page 95 of the transcript.

Discharge of Cucamonga Springs on same day, 9.23 inches. Page 3451 of the transcript. Showing that on those two dates the water elevation of well no. 7 was identical while the discharge varied considerably.

Then again on May 7, 1904, water elevation in well no. 7, 1347.6 feet, page 89 of the transcript. Discharge of Cucamonga Springs on same date 17.88 inches. Page 3969 of the transcript.

September 29, 1906, water level in well no. 7, 1347.3 feet. Page 96 of the transcript. Discharge of Cucamonga Springs on the same date, 10.42 inches. Page 3451 of the transcript. Showing a difference of only .3 of a foot between the water level in well no. 7 on the two dates and yet a very great difference between the discharge of the Cucamonga Springs on the same two dates.

August 5, 1905, elevation of water in well no. 7, 1342.5 feet. Page 93 of the testimony. Discharge of Cucamonga Springs

on the same date, 7.45 inches. Plaintiffs Exhibit 3. May 7, 1906, water elevation in well no. 7, 1342.5. Page 95 of the transcript. Discharge of Cucamonga Springs 10.02 inches, page 3451 of the transcript. Showing there again that the elevation of well no. 7 was exactly the same as on August 5 1905 and that there was a very large percentage greater discharge at the Cucamonga Springs.

On March 30, 1908, elevation of water in well no. 7, 1373.4 feet. Page 3544 of the transcript. Discharge of Cucamonga Springs 49.71 69.2 page 2533 od the transcript.

March 15, ~~1905~~ 1909, elevation of water in well no. 7, 1373.4 feet. Page 3855 of the transcript.

Discharge of Cucamonga Springs and Y Tunnel. 72.3 inches, pages 3872 and 3969 of the transcript. The last two show the same level in well no. 7 with a very large variation in the discharge of Cucamonga ~~Creek~~ Springs.

October 21, 1907, elevation of water in well no. 7, page 3468 of the transcript, 1360.4 feet. Discharge of Cucamonga Springs and Y Tunnel. 70.4, page 2477 of the transcript.

December 6, 1908. elevation of water in well no. 7, 1360.6 feet, page 2545 of the transcript.

Discharge from Cucamonga Springs 32.04. Page 2533 of the transcript.

Mr. Britt: Is that anything more than the table Mr. Trask put in?

A Yes this has not been put in evidence. There is just one more. May 11, 1908, elevation of water in well no. 7 ~~1374~~ 1374.7 feet. Page 2544 of the transcript. Discharge of Y Tunnel and Cucamonga Springs, 78.68 inches on same

date as per plaintiffs exhibit no. 78. October 9, 1900, elevation of water in well no. 7, 1376.7 feet (2.8 feet higher, only, than the last date read, page 89 of the transcript. And the flow of Cucamonga Springs on September 26, 1900, by exhibit 32, measurements by Mr. Wright, 126.75 inches. A very great difference in the flow with very small difference in the height of no. 7. And other measurements on exhibit 32 show that the flow really increased, if anything, after September 26, so it may be comparable to the October 9 measurement. Those are a few of the figures which I have collected.

Q During those times was well no. 3 pumped at all?

A This was well no. 7.

Q I mean well no 7.

A Well no. 7 was undoubtedly not pumped except on one or two of those. The record shows when it was pumped and I didn't make any note of that. But there may be one or two of these when it was pumped, and there may not be any when it was pumped. I can look that up.

Q Well no. 8 was pumped right alongside of it?

A When I speak of pumping I mean either well no. 7 or 8. On October 21, 1907, December 6, 1908, the wells were not pumped anywhere at that time. But I will supply that to-morrow morning-- that information in regard to the pumping.

Mr. Goodcell: However the variation may be, up or down, more or less, the fact remains, does it not, that assuming the condition which I proposed to you, that having a duct leading from the well to the springs, there would be some

[illegible]

[illegible]

[illegible]

discharge from that duct from the well to the springs, so long as the elevation of the water in the well was higher than the elevation of the springs.?

A Yes. And further, every day the elevation of the water in the well reached to some previous elevation on a previous day, the discharge of the duct would have to be the same as on the previous date.

Q Wouldn't that depend on two things: first, the fact that the variation in the well and the variation in the springs would be practically instantaneous or contemporaneous,-- that the change in one would affect the change in the other at the same time?

A Yes, they would; because the springs are fed by the drawn artesian water. They couldn't rise if they were not under pressure; and therefore the change of the level in this well would have to be instantaneous or within a very few moments at least.

Q That would be the one assumption. The other assumption is that the entire flow of the springs comes from one duct leading from that well. That was the hypothesis I gave you.

A That, I believe, was the hypothesis that you gave me. That the entire flow came from that duct. But if the entire flow did not come from that duct, and we say that it was as low as 6 and a fraction inches, it wouldn't amount to much, and the duct must be at least below the present level in that well or probably lower than it ever stood, because 103 feet head make the elevation 1357 and a fraction feet above sea level in that well in the bot-

tom of the shaft, and the duct would have to be below that.

Q But the discharge from that would not depend on where it is connected with the well but the pressure of the water in the well bearing on the duct.

A Certainly. But my remark was directed to another question, namely, that the duct could not have gone dry at any time, since the well has never gone below the point above which we know there is no duct.

Q Suppose this duct instead of striking the well at a point far below had been a duct which, like our pipe line, had struck the well or connected with the well at a point only a few feet below the normal surface of the water. Then if that well was pumped or the water went down in it, it would cut off the discharge from the springs?

A I don't think I quite understand the question.

(Question read.)

A The point that puzzled me is what you call the normal surface. That has varied at different dates. If you fix some date to which that question refers--

Mr. McKinley: Let him read the question again. I think when he hears it again he will understand it.

(Question read.)

~~If~~ A If the well was pumped and the water elevation in the well fell below the point at which the duct connected with the well it would of course cut off the supply at the springs, no matter where the duct is located, if there was one there, ~~xifxxx xhxxxx xx xxxxxxxxxx~~ and it should be so situated that at any time the water would fall below the bottom of the duct, it would cut off the supply to the

springs.

Q And then the result would be simply the draining out of that duct and the springs then would cease to flow?

A Yes; the duct would become empty in a short time if it was coarse enough to transmit any considerable amount of water, and the springs would cease entirely.

Q I understand that in your opinion there are ducts more or less open leading through the ancient alluvium.

A There are. I believe that receives all its water in that manner.

Q And those ducts at the time of the uplift of the Red Hills were tilted at that point?

A Yes; they would be bended as the fold would cause the uplift of the Red Hills. The same lateral pressure causing the uplift would also depress that portion of the ancient alluvium between the apex of the fold and the mountain range, and the counter-fold or depression at that point would leave these ducts very much in the form of siphons running under the syncline, and would emerge at the break in the formation or where the formation was denuded by means of gulches or otherwise, or general denudation of the top at the Red Hill anticlinal.

Here the Court takes a recess until tomorrow, April 13 , 1909, at 10 o'clock a. m.

---------000---------

J. W. McKinley.

IN THE

Superior Court

OF THE

County of San Bernardino

State of California

Cucamonga Vineyard Co., Plaintiff vs. San Antonio Water Co., Defendant	Vol. 51, Tuesday, April 13, 1909

I. BENJAMIN, Official Reporter

Tuesday, April 13, 1909. Fifty-first Day.

F. C. FIELD.

(Cross Examination resumed by Mr. Goodcell)

THE WITNESS:- Mr. Goodcell, I made a mistake yesterday in reading one figure from the book. I would like to correct that. In giving the measurement of the Cucamonga Springs October 21, 1907, I read the measurement of one of the wells which was pumping instead of the Springs measurement. I wish to change that ~~tax70x4~~ from 70.4 to 32.55 inches, and the date to October 17, 1907, as there was no measurement of the Springs on the 21st of October, 1907, the nearest one being that of the 17th of October.

Mr. Goodcell: Q Did you ascertain the depth of those two wells that I spoke about?

A Yes, I have that ~~xxxxx~~ note-book here this morning. (Consults note-book). One of these wells, Mr. Goodcell, I have not the depth given; the other I have. Those wells are the ones which are referred to as No. 1 1899 well, in which the water stood sixteen feet below the top of the casing, and the other, No. 2, 1899 well, in which the water was flowing into the tunnel on the 25th of August, 1899. I have the depth of the one flowing into the tunnel as 546 feet, but the depth of the other is not given. I think probably Mr. Wright has that, as he has all of the data relating to these wells. The figure which I gave you, 546 feet flowing into the tunnel, is based on what Mr. Stowell told me at the time. I know nothing about it personally.

Q Do you know how long the well that was not cut into

the tunnel continued to have water standing at a considerable elevation above the level of the tunnel?

A Until it was cut in, some time in the early part of 1900. The last time I saw that condition was on the 13th of December, 1899, and this first observation was the 25th of August, 1899. After that it was cut in, and I never saw that condition any more.

Q Was that condition continued for some considerable time?

A At least from the 25th of August to the 13th of December, 1899.

Q I understand you to be quite positive in your opinion that there is a duct, or more likely a number of ducts, leading through the old alluvium to the Cucamonga Springs?

A Yes, my opinion is very strong on the subject, that there is at least one and probably more of such ducts leading to the Cucamonga Springs.

Q And that duct that leads through that old alluvium to the Springs or the wells, or other places, I suppose those ducts are at different levels and may even cross each other at different elevations?

A Yes; and further than that, I think probably some of them may be composed of the junction of two ducts like, for instance, when Deer Canyon would flow to the westerly and Cucamonga Canyon to the southerly or southeasterly, the two might meet and from their junction down might form a single duct, whereas above the junction they would be separated.

Q Well, all these ducts derive water from the down-flow from the mountains?

A Yes, from the same watersheds.

Q And that water passes first into the modern alluvium and sinks down to the older alluvium?

A Yes.

Q So that there is at some point or points a contact, a communication, between the modern and the ancient alluvium?

A There is a contact of formations; I don't believe there is a contact of saturation.

Q But there are some points of contact where the water passes from the modern alluvium into the old?

A Yes, over quite an extended area, near the foothills.

Q Now, you sayyou don't believe that contact is within the plane of saturation?

A No, I do not.

Q You don't know, do you?

A Well, deductively I suppose I do, because of the time which it takes for the effect of rainfall to permanently augment the water sources in the old alluvium, which indicates that the contact is not one of saturation at the foot hills. To illustrate, for example, the lowest time of the flow there was in 1905 --

The Court: Q By there you mean where?

A At the Cucamonga Springs; and that year had been one of good rainfall, much above the average; that is, the year 1904 --1905; and yet the permanent effect had not been felt; but towards 1906 that effect became felt, and has continued to increase in a distant ratio from the rainfall up to the present time until now the Cucamonga Springs have reached the highest state of discharge which they have had

since the low state in 1905, something over 30 inches having been discharged there a few days ago when I was there.

Q And the elevation of the surface water along the Sixteenth Street wells has also reached the highest point, has n't it?

A Reached the highest point since the low depression.

Q And the water at the wells is in the plane of saturation?

A Not of the ancient alluvium; of the recent formation, speaking of the Sixteenth Street well.

Q And the Sixteenth Street wells did not feel the full effect of the replenishing of the basin for some time after the rainfall, did they?

A No, they felt temporary effects from the accession to the plane by rainfall near the wells and streams which might pass near the location of the wells, but the permanent effect has been growing there and has been slower in reaching the wells than it has the Cucamonga Springs; in fact, the rise of the Sixteenth Street wells this year is not any higher than it was last year, while the Cucamonga Springs are flowing much more water than they were last year, nearly double, so it seems that the effect on the ~~xxx~~ Cucamonga Springs has been more rapid during the past year than it has been at the wells on Sixteenth Street.

Q Don't you find the greater rise in elevation of water at the lower levels -- that is, lower down the grade?

A Proportionate?

Q Yes.

A Why I think usually in the same waterplane that the reverse is correct, namely, that the greater rise occurs near the foothills, where the feed or supply is coming in, as distinguished from the lower levels.

Q In expressing your opinion that there is no contact in the way of communication between the modern and ancient alluvium except near the foot of the mountains, do you base that conclusion wholly upon the observation of the flow of water or upon geological deduction, or both?

A I have taken everything into account; both the flow of water and the behavior of the waterplane, as well as the structural conditions of the earth.

Q I understood you to say some days ago that there had been no borings or excavations in the modern alluvium north of the Red Hills which has penetrated to the ancient alluvium?

A I think that is correct, with the exception of the Lady Tunnel.

Q Well, that is not north of the Red Hills?

A Well, it is northwesterly; some of the wells are between the two Red Hills, and northwesterly of the main Red Hill, and very close to it, and those have undoubtedly penetrated both formations; there is one other possible exception in the testimony on that, and that is the Sourwine Well, belonging to the Upland Water Company; that would seem, from the log given by Mr. Dillman, would seem to have passed through both alluviums, starting in the modern and penetrating finally into the ancient.

Q You speak of that well as starting in the modern allu-

A. Yes I think usually in the case mentioned that the pressure is normal, usually, that is, the pressure that exists since the formation, where the fluid is usually in equilibrium with the rock.

Q. In connection with cycling that there is an analogy in the way of accumulation between the reservoir and the factory although the fluid of the reservoir, in the case of the reservoir, may contain small quantities of gas and condensate, in the case of the factory it may contain small quantities of the liquid or water as well as some condensed hydrocarbons, or both?

A. I have been speculating into economy; with the flow of fluid and the balance of the reservoir, is well as the mechanical conditions of the work.

Q. I understand you to say some days ago that there had been no injection or accumulation in the reservoir although with the use of the water the production of the Ashland Sand.

A. I think that is correct, with the exception of the very [illegible].

Q. Well, how do you deal at the end [illegible]?

A. Well, it is surprisingly; some of the wells are located in the [illegible], and surprisingly of the wells the [illegible] and very close to it, and there have been [illegible] [illegible] Sandstone. There is one other [illegible] adjacent to the [illegible] and that is the Juniper [illegible]. Production in the Upper Pale [illegible]; that well was from the [illegible] [illegible], which was to have passed through such [illegible], starting in the [illegible] [illegible] [illegible] the [illegible].

Q. The [illegible] at least well is standing in the [illegible] [illegible]

vium?

A Yes, which we see there on the surface; and then finally penetrating into the ancient. You will remember that Mr Dillman stated that the rocks brought up from the bottom of that well were of a rotten character, and that they were easily broken, which do not resemble the surface rocks.

Q That was from the shaft?

A Yes, sir; it was from some part of that well, the Bourwine Well owned by the Upland Water Company; those rocks being of that decomposed nature, would indicate that at that point you had already penetrated into the ancient alluvium.

Q But that was near the surface?

A Well, I don't know how near the surface.

Q It was within the dug part of the well?

A Yes, sir; that was quite deep; it was dug if I remember rightly, over 130 feet deep. I am merely comparing the rocks with those that I see there on the surface. I think at some point, it might only have been ten feet or might have been fifteen feet, but at some point, basing my comparison on that testimony, it seems to me that the Bourwine well of the Upland Water Company must have penetrated into the ancient alluvium, when those decomposed rocks were discovered.

Q And you think it draws its water from the ancient alluvium, as to the bored portion of the well?

A That is my judgment, basing it wholly on Mr. Dillman's testimony, taking all of the conditions together as he referred to them.

Q Can you conceive of such a thing as there having been

an uplift in that locality, a fold, bringing this ancient alluvium up above the surface at the Red Hills, creating some degree of dislocation and rupture of the old alluvium and the old channels?

A No; I think that is accompanied by a rupture or fracture of the old alluvium on the apex of the Red Hills, as it would have to stretch the old alluviums. My conception of that uplift is that it was caused by lateral pressure as ordinarily uplifts are, and that it took place along the line of some old fault in the deeper rocks; and these ancient alluviums being unconsolidated, to some extent would stretch, and instead of extending the fault to the line of the surface as would have been the case with the crystalline rocks, the surface would stretch and the synclinal of the Red Hill would be compacted in the bottom of the synclinal above there.

Q And at the time of that uplift the process of building up the valley above, that is between the Red Hills and the mountains was still going on was it not?

A My opinion is that that never ceased entirely, but that its activity was modified by the varying levels of the mountain range, which in the Pleistocene was high, lower in the Champlain period, when it subsided, and at the end of the Champlain or the present began to be re-elevated, until it finally reached its present level.

Q And you don't know what changes in that locality may have taken place by fracture or by erosion, at the time the uplift was going on?

A The fracturing, we can estimate as to where it would occur

with considerable accuracy, namely, that it would be on the apex of the fold or on the anticlinal; and the erosion we can always form a very fair opinion as to where it would occur, namely, near the foothills, because the uplift was gradual, not occurring at one single convulsion; and therefore the bottom of the basin would be protected and the erosion would have undoubtedly occurred near the foothills.

Q And even since that uplift, have there not been changes in the floor of the valley, sinkings and risings?

A There has not been any subsidence since the Champlain period; but there has undoubtedly been a progressive uplift, and even at this time it is believed by geologists that an exceedingly slow movement of uplift is in progress, and while it may rest for some hundreds of years, or lesser periods, that the time has not passed when these uplifts are over; and that the phenomena which we have, accompanied by earthquakes and other convulsions are merely the external evidences of the same activity which formerly caused uplifts.

Q You know of wells, do you not, having been bored into the modern alluvium, and down below sea level, without passing below the modern alluviums?

A Not in this locality; I do know in some other localities; but in this locality I think there is no well below sea level; I don't think there is any well anywhere near sea level in this locality.

Q No, not there, but further out from the mountains?

A Nearer the coast I know of wells which are bored a great depth below sea level.

Q And still in the modern alluvium?

A Still in the modern alluvium; and unquestionably in those localities the uplift has not yet been sufficient to elevate the ancient alluvium above sea level; that being further from the mountains we would also expect that very thing.

Q Now as these ducts which feed water into the ancient alluvium draw their water from the overlying gravelbeds of the new alluvium at some point, does it not follow that any abstraction of water from the modern alluvium may directly or remotely affect the inflow of water into the ducts that supply the old alluviums?

A That is true, Mr. Goodcell, if the water it is in the zone where the two are in contact, that is, the two alluviums touching each other with the space between open by reason of erosion or uptilted strata.

Q If there is communication between the ducts of the old alluvium and the saturated mass of the new alluvium, then any abstraction of water from that saturated mass would have a direct and speedy effect on the discharge of water from those ducts, would it not?

A Assuming that the mass is saturated at the point where the two are in contact, and assuming further that the supply be insufficient to give the old alluvium its quantity of water, and also supply the drafts on the new alluvium at that point, there would be such an interference. It might be theoretical, or it might be practical.

Q And if those ducts, any of them, do have communication with the modern alluvium within, what you may call the zone

of saturation, would not that fact tend to show the freer and greater discharge of water into those ducts? In other words, if the duct does communicate with the saturated mass, wouldn't the supply of water to that duct be larger and more constant than it would if it simply depended on the inflow at some point above the plane of saturation and nearer the mountain?

A Yes, under such a condition I would say that the supply would be absolutely constant. The only variation would be due to the head of the overlying saturated mass. It would not vary with any condition except that head.

Q But any abstraction of water from the saturated mass which lowered the head, to the same extent lowers the disC harge to the duct.

A In the assumed conditions that you make, that would inevitably follow. It would have to be complete saturation of all the voids so that one molecule would rest on the other.

Q If the heads or openings of these ducts at their intakes are far up towards the mountains, still if the plane of saturation of the overlying new alluvium was sufficient to extend up near to the mountains, that would add to the pressure of water, and the inflow of water into those ducts?

A Yes; if the plane of saturation of the new alluvium extended over the opening of the ducts, and the saturation were complete, that would undoubtedly add to the old alluvium at that point. In answering these questions, I am answering on your assumed hypothetical conditions, and not on any of my own opinions as to the conditions.

Q It does not involve any admission on your part that such conditions exist.

A That is what I understand.

Q Now, in a state of nature, before there was any invasion of the Cucamonga district by wells and tunnels and pumping plants, the discharge from the Springs was in a great measure a constant discharge was it not? That is, it varied somewhat, but it didn't vary very greatly?

A As far as we have any records, it has varied greatly at all times. You take Exhibit 32 of the plaintiffs, which gives all the old measurements that we have knowledge of, it shows very great variations. Back of that we haven't any knowledge except such as we can gather by reasoning from the geology and the ancient hydrographic conditions; and under those conditions, I believe there were equally great variations. The conditions of the Red Hills would indicate that at some ancient time the water has risen through the ancient alluvium almost to the summit of the highest Red Hill. We can see by walking over the surface the remains of ancient peat in the soil up to a very high level. That is, a time antedating historical times, and my judgment is that the measurements as well as the deductions to be made from observations at the surface, -- that the discharge there has been very variable, and that it has decreased very much in modern times from what it was in prehistoric times.

Q I suppose you cannot say, however, that that is because of the lower waterplane or because the hill has been lifted higher?

A I doubt whether there has been sufficient crustal movements since the old peats were formed to make any perceptible difference in the hill, and my judgment would be from

what I know of geology, and those things generally, that it has been due to a progressive decline in the rainfall as well as some artificial interference like the diversions at the foothills in recent years, say going back to the early 80's when the diversions began.

Q Then the general theory of geologists is that there has been a progressive decline of precipitation ever since the Champlain period, and that climatic changes which have occurred have caused the shrinkage in precipitation. That, however, has been so slight that it has not been observable within the years covered by human history, as those years are so relatively short a period of time when we compare them with geological periods.

Q The streams that flow from the mountains, for instance Cucamonga Creek, have from time to time changed their course considerably have they not?

A Yes; they have traveled within wide limits in building up the debris cones, both in the ancient and modern alluviums.

Q And may have flowed off to the west some times and at other times to the east, so as to leave its former channel dry for a longer period?

A Yes, that occurs. The process is one of depositing in the channels and raising the channel higher and higher, finally higher than the surrounding country, and a point is reached when the elevation is sufficient and the stream will break over and form a new course through some part of the valley which has for perhaps hundreds of years been without a stream channel. That has undoubtedly occurred.

Q And that has been the history of those streams during all

the time, of filling up the valley with the modern alluvium?

A That is true.

Q Suppose that the present Cucamonga Creek which now has a channel flowing along the east side of what we call the Red Hill -- one of its channels -- suppose that the water of that creek should change, or the flow of the creek should change to a considerable distance to the west, say, so as to leave that present channel along the side of the Red Hill dry for a long period. Such a change of course may take place, may it not?

A It may.

Q And if such a change did take place, would it not follow in the course of time that the present gravel bed of Cucamonga Creek along the Red Hill would become covered with silt and clay and washings from the sides of the Red Hills, both east and west, so that that gravel channel would be completely covered with a much finer material in the course of time?

A I doubt if at the present time there is sufficient fine material to assume that such a thing might occur. The very high eleveations of the mountain range to the north as well as the complete stripping of that range of nearly all its fine surface covering would make that a very remote possibility. I believe, however, that locally such washes from the present plain below might deposit beds in that channel of more or less fine materials depending on where they come from.

Q It takes a toleraoly strong flow of water to carry gravel and boulders down there, does it not?

A Yes, sir, it does; it takes quite a current of water.

Q And however unlikely it may be that the conditions I have supposed might ever come to pass, yet assuming that they did come to pass, that for a long period of time the water of Cucamonga Creek was diverted a considerable distance away so that none of it flowed down over that channel, that channel would in time become covered with a much finer material than that which now composes the channel?

A Yes; on that assumption it would cover the surface if there was water running there at a low velocity. It would cover it over with a finer silt.

Q That would be the ultimate result, and in time that fine silt would have a vegetable growth upon it?

A Yes, that would be true. It would gradually decompose, and would grow grasses and brush.

Q And there might even be gopher holes in it, such as were noticed over on the other side?

A Yes, if the surface of the ground consisted of fine soil it would undoubtedly be burrowed by animals.

Q If after that channel had been thus covered with a finer material, the Cucamonga Creek should shift again to the east and flow down in the same direction, or nearly the same direction in which it flows now, wouldn't the water from that creek then seep into ~~the~~ and follow down that buried gravel channel which is now the present channel?

A I think it would, as part of the whole general plane of saturation, because the present channel has no inclosing features around its sides; and while the water, as you say, would pass under that blanket and be separated by something in the nature of a lens, nevertheless, the entire surface of

the wash there today is coarse all along between that and the washes to the west, and it would therefore not have the same effect as if that channel were enclosed on the sides as well as the top, and it would also have to be enclosed on the bottom.

Q You have stated (I don't know exactly on what knowledge or authority) that the gravel deposits in that channel are shallow?

A Down at the Red Hill?

Q Yes.

A You are limiting it to that point.

Q Yes.

A I misunderstood you. I thought you were speaking about up at the basin. Down at that point the condition you speak of would obtain; that is, it would then be an enclosed channel.

Q And that would really constitute one of the ducts?

A It would be a local duct which would be covered over from the point where you know that it is ~~[illegible]~~ in the Red Hills.

Q And if the supply of water in the more porous portions further north was considerable, after the water entered that enclosed channel flowing down to that limited area, there might be some breakings out in the way of springs along the course of that channel, might there not?

A I don't think you could get any water into it, because the total supply of rainfall from the watershed would be insufficient to ever raise the plane of saturation up to that point. The natural equilibrium of the water traveling is

such that with the present amount of precipitation you could never hope to raise the waterplane in the recent formation that high, and it would therefore be a dry channel.

Q If the waterplane were raised sufficiently high, then the water being forced by that elevated waterplane through that covered channel might break out in the way of springs?

A Yes, it would then come out, if you assume that the waterplane be increased with sufficient supply from above to raise it that high. Then the springs would appear south of the Red Hill in some lower part of the valley. They wouldn't appear anywhere at the Red Hill because there it would be covered by the impervious layer, which you have assumed. But I should say somewhere below the southern escarpment of the Red Hill and in the valley below, there might be springs, and they might not appear at all till you reach the Santa Ana River down by the section above Rincon. It is probable that they ~~do~~ would not appear, because there would be no obstruction to this channel below the Red Hill; and after you pass out into the fill below the Red Hill you enter again into the modern alluvium, and that is of quite free conditions as demonstrated by the Ritchie well and in that neighborhood, and the water would then undoubtedly sink from its hypothetical duct and become a part of the waterplane where that Ritchie well was originally placed, and I doubt if it would ever come to the surface till it reached the lower part of the Jurupa Ranch above Rincon.

Q I think that is probably true if it ever passed through.

A I assume that your channel is just as it is today, of course gravel down past the Red Hill and further.

Q But this channel where it passes along by the Red Hill is a comparatively narrow and restricted channel. Further north it opens out.

A Through the Red Hill, yes, it is merely a wash, and, as you say, it is comparatively narrow.

Q And if it was covered by impervious material, then at the northern end of it where that covering would practically cease, and there there would be practically an open surface connection between the covered channel along the side of the Red Hill and the porous debris to the north,

Now, the water there flowing from the north under those conditions would become restricted in area as it got down into this more confined channel, and the resistance would be greater because of the restricted area. Wouldn't that place the water in the confined channel under some degree of pressure?

A That is true if you assume that you have so much water that it could not be drained off without accumulating ahead.

Q If there was more water at the upper end of that channel than could find a passageway through the channel without considerable pressure to force it through, then at some relatively weak point in the overlying covering there might be a breaking through in the form of springs?

A Well, it might be, but it is more probable that under the hypothetical conditions assumed there would be an overflow at the head of the channel. That is, unless you have a very deep covering, and if you do, that merely adds to the strength; and without some bending or folding, or dam at the head -- I think the more probable condition would be an overflow on the surface by the water rising to the surface

in the recent alluvium at the intake of this hypothetical channel.

Q But if the water did once get into that hypothetical channel in greater quantity than it would get through without being forced through by some considerable pressure, then the tendency would be to break out in springs somewhere?

A If you assume that the upper head is sufficient to force an aperture through the top covering of the channel, it might be comparable to the pipe line where you put more pressure on the intake of your pipe than it will resist. It will rupture the walls of the pipe and cause a leak.

Q May it not be possible too, that in times past when the fill of the valley at those points was much lower than it is now, that there may have been a channel through the Red Hills more easterly than the present surface channel, that is, at some considerable depth below the present surface of the soil?

A I would say not, because the evidences there on the anticlinal of the Red Hills is one of denudation instead of aggregation. And that is the usual process followed in nature: That denudations occur on the summits and aggregations occur in the depressions. I wouldn't think there is any evidence on which to base that assumption. It would seem to me to be contrary to the physical evidence on the ground.

Q If there had been a channel through there a long period ago, and that channel had been left dry, that might have been covered over by washings in from the size and so forth the same as we assume might be the case in the present channel. Might not that be true?

A I believe if you confine that to the construction of the ancient alluvium, the very thing that you state has occurred. But when you come to say that such a condition could exist as between the two alluviums, I think that the evidence completely refutes the proposition.

Q What I have in mind is the possibility that at some tim in the past there may have been quite a deep gorge through there, along where the Cucamonga Springs and the Y Tunnel are now situated, and the present Red Hill on the west and another Red Hill is still there but much lower and more washed off on the east, and the stream may have flowed through that gorge between those two hills practically under where the Y Tunnel is today. Isn't that possible?

A I don't think it is, because if that had ever occurred, the conditions on the surface today would be the same as they are on the west side of the Red Hill, where ~~the condit~~ such a condition has existed; and there is no evidence on the ground there of any recent detrital deposit whatever; and if you assume a gorge of such a depth as that, it would have made lateral extensions by reason of the angle of repose which that material assumes when it is cut down, which would have obliterated the Red Hill on the east and west sides.

Q You have examined the nature of the deposit in the Haskell wells, have you not?

A I have -- one of them.

Q And I understood you to say that that well presented an admixture or a kind of a mingling of the old and new alluviums?

A Yes, I stated that, qualifying it by the statement that the old alluvium was the secondary deposit by material degraded from the apex of the Red Hills, and not old alluvium in its original location.

Q In what part of the Haskell well, or that one of the Haskell wells, do you notice the presence of portions of ancient alluvium?

A I think that occurs all the way down the Haskell well, that it is mixed with the soils of the ancient alluvium. And as far as the bottom of that well is extended and observed, the water undoubtedly having flowed there in a quiescence state instead of passing in a well directed current, which is explainable by the angle in the old formation, and that the great amount of fine sediments even of modern times, were mingled with the degraded material from the old alluvium, and that the Haskell Well is therefor made of a peculiar combination of admixture from the two alluviums, and in that regard it is very different from the Sixteenth Stree t wells as I call them, that is, wells 1 to 5.

Q But the Haskell well does go down into what we call free water gravel?

A In narrow strata. There are narrow strata of free water gravel; not so free by any means as the Sixteenth Street wells, nor as coarse, but sufficiently free to obtain goodly supplies of water, and those supplies of water had been somewhat permanent but not quite so permanent as well No.3, for example, of which I have knowledge.

Q But the ~~xxx~~ character of the material in the Haskell well is such as to, at some part of its depth any way, and a

A. The I stand that, qualitatively, the [illegible] [illegible] [illegible]

considerable part of its depth, such as to permit a uniformly free flow of water through that material, is it not?

A I think it is not a very free flow. I think these strata were dead ends of the intermingled formation. I prepared some diagrams which I intend to have Judge McKinley call for in re-direct, to explain the Haskell wells more plainly. If you would like to have those at this time, they will aid the investigation.

Q You designed to put in what?

A Some diagrams of the Haskell wells as to their geology which I have prepared since last testifying, illustrating graphically the condition of the strata and the formation there as I understand it. And those are intended to be presented before closing this case. If you would like the benefit of them I will produce them now.

Q If you have them, andy you might present them to us now.

A I have two of these diagrams: One is a plan, and the other a section through the line A B. As I thought there was some misunderstanding about my opinion regarding the Haskell wells, I thought well to illustrate it accurately. And this diagram which I now show you is a plan which shows on a scale of five hundred feet to the inch the location of the Rubio well, or well No.6, and the two Haskell wells, well 7 and well 8, and shows also the top of the Red Hill ridge below that point as taken from the topographical maps, by means of the green line marked top of Red Hill ridge. It further shows a curved line which is the hypothetical middle contact line of the two formations; and shows a yellow line called lower contact line which is what

I designate the lower contact line of the recent quaternary formation and the ancient quaternary formation. On this line I have drawn a broken line A B, along which the geologic section of the next diagram is laid. This diagram which I now refer to is called geologic plat near Haskell Wells. Scale, 500 feet equals one inch, and with an arrow below the title pointing to the north and marked N over the arrow.

The Court: Q That is supposed to be a flat portrayal?

A Yes, it is a plan. It is not a surface plat there, because it shows these hypothetical middle contact lines and lower contact lines.

The next plat is a section along the line A B.

Mr. McKinley: In order to get the record straight, with Mr. Goodcell's consent I would like to offer that in evidence.

Mr. Britt: We object to the reception of the evidence as being a mere surmise of the witness, and not founded on any evidence in the record.

The Court: Overruled. Plaintiff excepts. Marked Exhibit Z 13.

Mr. Goodcell: Q I suppose it is only illustrative of his view in the matter?

A The one just offered is merely offered for the purpose of locating the next diagram which is a section on the line A B, on the former one, and is entitled geologic section A B. Legend: "Red denotes recent sediments, mingled with material denuded from ancient formation. Blue denotes recent gravel strata connecting gravel basin above Base Line, and through the middle in a slanting direction towards the right-hand side is a green line which is solid to the surface

of the ground, which surface of the ground is marked "surface of the ground," and is taken from the topographical map marked Exhibit P in this case. Above that point the green line is dotted, as being the probable former outline of the Red Hill before it was denuded. The plat is not sufficient to include what I would term the highest apex of that hill at some former time, but the line is again shown as a dotted line below that point on the right-hand side of the diagram to indicate that after the fold was made it would descend in the same manner. The portion so dotted above is marked former summit now denuded, being the portion above the present surface of the ground. The place marked top of Red Hill ridge corresponds in location to the line marked similarly on the previous diagram.

The Court: Q That indicates the present top?

A Yes, sir; the present surface top as it is now found. The remainder of the diagram is made up of what I consider the probable conditions of the Haskell well, or of the two Haskell wells, wells 7 and 8, both of which are shown close together. And before entering on a further explanation of that, I wish to state that the scale of this is ~~discarded~~ Stricken. The scale lengthwise or horizontally is the same as on the previous diagram, while the vertical scale is marked in feet of elevation above sea level.

The Court: Q Horizontally it shows the conditions compressed?

A Yes, sir; very much compressed, as compared with the vertical scale. That can be determined by taking 500 feet on the scale in the horizontal length, and the figures given

vertically. The formations may appear distorted and thicker on the diagram than they are really on the ground.

The Court: Approximately, what percentage of distortion is that?

A Vertically an inch is 120 feet, and horizontally 500 feet, and the distortion is in that ratio. Now, the conclusion I arrived at in regard to the Haskell formation is this: That being at a point where there is --

Mr. Britt: We object to the testimony inasmuch as it appears that the defendants, the San Antonio Water Company has in its possession logs of these wells.

* *

The Court: So far as the Court is concerned, I don't propose to regard as evidence any statements of the witness hypothetically or theoretically, based on purported logs of the wells till those logs are in evidence in some way. And I have permitted this evidence to come in as though it was a pure assumption on the part of the witness.

Mr. Britt: Very well.

A This does not even embody the log of the well, because the log of the welll not being in evidence I did not even make the strata like the log of the well. If you put the log in, you will find that the strata will be as found here, but the thickness will be different . This is only a geologic section. I do not designate it as the log shows it.

The Court: As everybody is anxious to get the logs of the wells in, -- I understand that you have copies?

Mr. McKinley: Mr. Trask has copies.

The Court: Haven't you witnesses by whom you can verify them?

[illegible]

[illegible]

[illegible]

Mr McKinley, Mr.

The Court: I don't mean the original logs, but you can prove that they are copies produced by somebody in good faith and acted on in good faith.

Mr. Haskell: Are those the logs that seem to be transferred on themap presented here the other day?

Mr. McKinley: I assume so; I don't know.

Mr. Goodcell: I understand this diagram to be simply illustrative of the witnesses' views.

Mr. Britt: I understood him to say that it was a section derived from the evidence.

Mr. McKinley: No, that is not right.

The Court: It may be possible that in some of the early diagrams which Mr. Trask may have ~~introduced~~ introduced he may have taken some of the logs and used them; but unless they are connected up, I do not consider them as part of the evidence in the case. This is simply hypothetical.

Mr. Britt: We have no objection to the ideal section presented here.

Mr. Haskell: Mr. Jolliffe tells me that as he understands it the logs from these wells are shown on an exhibit already in evidence here, and which is put in evidence except that the logs were not to be considered.

The Court: I have assumed and understood that some of these exhibits put in here did purport to represent something in the nature of logs of wells, but they are not considered as authenticated and aremerely the assumption of the witness till verified.

Mr. Goodcell: I should like to have in the best evidence

MR. MACKAY, Sir.

THE CHAIR: I don't think he weighted logs, but the men were used only as cables pushing by stepping in front of them and acted as a pole fulcrum.

MR. MACKAY: Are there any logs that have to be transported on Sunday remained here his other day.

MR. MCKINNEY: I know not; I don't know.

MR. MACKAY: I understand that Sigurd is a member of the executive plans.

MR. LYON: I understand his is my that if you're getting derived from the company.

MR. MCKINNEY: Oh, that is not right.

THE CHAIR: It may be possible that in some of the body discussed with Mr. Pratt may have subsequent information by may come before them of the Tyee not used Sunday. The matter may be discussed up. I do not consider that on point of the minutes in the case. This is simply hypothetical.

MR. MACKAY: We want to objection to the Board receiving prepared lists.

MR. MACKAY: Mr. MCKINNEY said on that we assumed that the Tyee Spar Sunday with are alone so in Sunday already on minutes comp. and which is put of minutes matters that Sunday were not in the Sunday.

THE CHAIR: I think assumed had misunderstood that open it. Some minutes pick in Tyee did pay-out to represent something on the minutes of Tyee of Sunday. Not they were analysed on to Tyee and not necessarily the minutes of the Tyee Spar Sunday.

MR. MACKAY: I would like to have in his own minutes

we can have.

The Court: I suggest we would better stop right here and clean that up. Mr. Goodcell, if you desire to use such logs as Mr. Finkle has, put them in, and if they are connected later on all right; if not, they need not be considered in evidence.

Mr. Goodcell: I think the purpose of my examination will be sufficiently subserved to have Mr. Finkle's general knowledge of it.

A On the left-hand side has been shown the structural conditions according to my understanding of geology, not meaning to state that the strata are of the thickness shown nor in the exact location shown, this being a hypothetical diagram to show my understanding of the geology. And on the right-hand side also, we find the legend in red: "Ancient quaternary formation uplifted, which means the anticlinal of the Red Hills forced up by lateral pressure. During the progress of that uplift my opinion is that the stream not only from Cucamonga Canyon but from other canyons like Deer Canyon and possibly some from Day Canyon flowed down and passed over the portion to the left which has been built up by other streams, and that while those streams are passing over there there is a continual denudation of the summit going on contemporaneous with the uplift, and that that material so denuded would partly go in gulches to the south of the Red Hill, as we see today the gulches running south, being gashes in the Red Hill, and would partly go to the north and there meet the stream material. That would cause an intermingling somewhat in the manner I have illustrated

by a contact along the fixed contact line on the Champlain formation, the red indicating the clays and silts intermingled in this manner, and the blue indicating coarser sand with fine gravel which were discovered in the Haskell well, and the small red patches in the blue indicating lozenges formed in eddies or any vortex of the stream; and this lack of conformability, the ancient formation being folded and lifted up and the recent being laid down nonconformably to it, on a different horizontal plane, or more properly, a different angle to the horizontal plane, that there is no passage of water from one ~~ti~~ into the other, and that these blue veins leading towards the lines marked Haskell Wells, or Well No.7 and Well No.8, are pointing towards the gravel reservoir; and that before the boring of these wells the water was in a state of inertia, this material to the south being lifted up so that the water in order to get through it would have to move at an angle to the strike of the formation; and also the compactness of the denuded material mingled with the silts nearer the line of contact would keep that water practically in a state of rest. But when the Haskell wells were bored that they would create a draft on these strata communicating with the eastern portion of the gravel reservoir in the recent formation; and the assumed structure at this point explains the lack of sympathy between these Sixteenth Street wells, one to five, and the Haskell Wells.

The Court: I would like Mr Finkle to make a similar cross section to this which he has been describing, north and south, from the mountains, including the foothills, and the red hills, so as to show your theory, Mr Finkle, graphically, of the ancient and modern alluviums, with reference to the foothills, and the red hills and the springs below; I think that would portray the theories for which you are contending, a little better than can be gathered, from a long direct and cross examination upon that subject

A I could do that on the geological section submitted by Mr Trask, by adding some features to that; that would be the quickest way to prepare it.

The Court: If you can make a cross section here, for instance here are the mountains, and here the foothills, and here the red hills and here are the springs, showing the relation graphically, I would like to have something of that sort, because I confess that this long examination is decidedly involved for my lay mind; I would like to know just what your theory is.

A It would be easy to construct it on one of the sections of Exhibit 2.

Q I would like to have you do that yourself, on a separate diagram.

A I will do that at the noon recess or tonight.

The Court: I confess my ability to understand a graphic portrayal of that, better than an oral examination.

Mr McKinley: We offer in evidence the diagram just explained by the witness:

Said diagram is admitted in evidence and marked

The Duke: I would like to find a bride a bigger dowry in his wife's or his own direction, more so than from the Duchess, leaving the Duchess, so the old girls, if it is for your dowry, or first, preferably, of the dowry and dowry already, with reference to the Duchess, and the Duke and the Duke's bride; I think that would destroy the bride for which you are marrying, a little before the second payment. Then a long-lived and epic ceremonies were very helpful

L.I Also is that so the original marriage dowries of Duke, by making some failure to that, that would be the ordinary way to prepare it.

The Duke: If you can make a large marriage dowry here, the reason why are the marriage, and why the Duke, and that is the Duke's bride and dowry in the Duke's, marriage the original marriage, I would like to have marriage of the Duke's, because I believe that this long marriage is probably learned for my lady sake; I would like to have you that long dowry to.

L. It will be easy to marry it in one of the marriage if Duke's.

I would like to have you do that regard, as a separate dowry.

L. I will do that as the dowry is bright.

The Duke: I believe my bride is marrying a dowry marriage at land, which has a real marriage.

Duke (aside): So after I marry the Duke's bride I relation to the dowry:

Duke dowry, I relation to relation the marriage.

PLAINTIFFS' EXHIBIT Z14.

Mr Goodcell, Q. It is true, is it not, that even in a saturated mass, you get free water, that is, water that you lift by the pump, only from the comparatively coarser material?

A. That is true, because the fine material holds the water back, and it cannot enter your well.

Q. And water has been pumped from that Haskell well in large quantities?

A. It has.

Q. So that there is at some positions of the depths of that well at least a tolerably free material, that is a coarse enough material to admit of a tolerably free flow of water through it?

A. Yes, sir; they are in narrower veins than in the 16th street wells; there are comparatively coarse materials laid down, if you compare them with the fine ones there, but not so coarse as those on the 16th street wells.

Q. On what do you base that statement?

A. When the Haskell well number 1, which is well number 7 in this case, was drilled, I had an opportunity of observing its character, and I had the same opportunity with well number 1, which is now known as well number 3 in the case, and there was a vast difference in the size of the grains of the material which came from the two wells; well number 3 brought up large rocks, which gave considerable trouble in penetrating while the well number 7 produced only smaller gravel, with sand in it; yet the two gravels from the two wells were evidently of the same character; that is, there was no yellow

[illegible] QUESTIONS.

[illegible]

[illegible]

[illegible]

decomposed material between them, and they were not decomposed or impaired in any way; they were firm, hard, wash gravels.

The Court: In 1900, in conjunction with the McPherson case, I visited this same section; my recollection is that one of the wells superceded a well which was partially driven at that time, and by reason of encountering large and hard boulders, the original well was broken off, so that it could not be finished, and another well was driven close beside it; and at the time we were on the ground, if I remember right, the men were at work on the second well, and showed some of the pieces of the old pipe which had been taken out; Do you remember which well that was?

Mr. I recall the circumstance, but I don't remember which one it was; I recall the circumstance you mention, but I think you would have to obtain the fact as to which well that was from some of the officials of the San Antonio Water Company, as I never made any note as to which well that was.

Mr McKinley: I think probably Mr Frank would know that; I will endeavor to supply the information to Your Honor; I will endeavor to supply the information to the Court.

The Court: The reason I inquire for that is because of the fact that it indicated a very coarse formation somewhere below - large boulders.

Mr Goodsell, Q. Then you have the Haskell well located if I understand you, in what would practically at nearly all times, be on the side, or in the eddy of the stream, and not in the line of any channel.

A. Not in the line of the main flow; undoubtedly side chan-

nels have passed through that area from the main stream, but owing to the peculiar strike of the ancient formation there, that would be in a more quiescent part of the basin, and the violent flows of water which brought down the very coarse gravels could not have passed through that location, but further to the west.

Q. Now, as the location is represented here on Defendants' Exhibit F. that well is practically in a corner, a corner that is bounded on the south and on the east by the Red Alluvium, as marked on the exhibit.

A. Yes, I see it is; but I hardly think that that is a corner; I think it is more of a curve, and on this map the Red alluvium is brought a little too far to the north, on the westerly portion; I made another drawing which more nearly expressed my own ideas ; I forget what exhibit that was; it was Z9 or Z10; I think Z10; as there are no wells between the 16th street wells and the wells at the Sadie tunnel, that zone is unknown as to the depth to the ancient formation; while this exhibit F does show what you indicate, I hardly think such is the fact; so far as explorations now go, the red alluvium has not been disclosed as far north as shown on the northwesterly part of that, nor has it been disclosed to be in the form of a corner; the old alluvium is disclosed by the Y tunnel well, but from that point to the Haskell wells there is a zone about which no condition is explored, and it is wholly left to inference.

Q. And you think in the times past that the discharge of the water from what is marked gravel basin on this exhibit, has been to the south, through what is marked on the exhibit as

daily have passed through that door upon us does change, but notice is the peculiar duties of his national travelling theme, that should be in a more intimate work of the world, but the vigilant times of author which brought down the very matter greatly worth our have passed through that door, but the time to the work.

I for, at the location is experiments that an definitely' quality I. that well is practically in a moment, a matter that is founded on the people and the work by the equipment alterations, as passed on the within.

In the, I per in, are I deeply which that in a comment; I which it is very of a moment, and to finding the and activities is thought a little has for is the world, on the weekly periods; I same question direction those more usually expressed by and times; I report was written that and; it was it my day; I which did; on that and to write between the 1888 which with the and of the their manual, that and in advance to the days to be written Tuesday; while this written I does know what you intends, I hardly said know in the fact; is for to explanations now yet, the attributes of some changed to the with is when in the variability part of 1888, day has it was indicate is be is the free of a century; the its allows is finished by the I based well, but free look world is the lowest while there is a case other and to condition is explained, and it is early fair to interest.

It has you made it the time that was the language of the model free that is better great with in its ability, but been in the work, through what is written to the within is

the outlet?

A. Yes, confining that to recent times, and not to the early quaternary; confining that to the recent quaternary.

Q. And the deposit penetrated by the 16th street wells is all part of the recent quaternary is it not?

A. Yes, that of the 16th street wells 1 to 6, is all part of the recent quaternary, and in wells 7 and 8, there is an admixture, as I explained in my hypothetical diagram.

Q. Is not always the natural tendency of the water flowing from the mountains to strike to the lowest point that it can reach as an outlet?

A. That is just what it does.

Q. Isn't the tendency to take nearly a direct course to that lowest point?

A. Well, provided there are no local obstructions in the channel, which may deflect it; there may be such a thing as a deposition of boulders or drift, which would turn a channel from its straight course, and that is usually found to be so,

Q. And if at the time these gravels were laid down, in which the 16th street wells were bored, there did exist the Red Hill formation, as depicted on this exhibit, and to such an extent as to create a barrier, so that the water could not flow southerly from those wells, across what is marked as the Red Hill or the red alluvium, isn't it a fact that the water flowing on to the lower outlet west of the Red Hill would leave a pocket or eddy, where those 16th street wells are located?

A. It would do so; there would be there also that would be

so low as to deflect for the time being a part of the stream into the pocket, but the usual condition would be that of leaving an eddy, or pocket; that would be to some extent influenced also by the Beer Canyon water, which would in reaching that point take more of a slant across to the southwest.

Q But most of the Beer Canyon water in all probability went to the east of the Red Hill alluvium did it not?

A I think it has flowed both ways; the debris cone of Beer Canyon indicates that, that it has flowed east and west; most of it, ofcourse, as you say, as flowed to the east.

Q And if the deposit where the Haskell wells are had been laid down in an eddy or a pocket, or under such conditions that the water was standing, as you say it is at present in that well, would it not be the fact that the deposit at that point would be so largely of silt and finer material, that it would be impossible to get a good well there?

A I think not, Mr Goodcell, because in depositing in the eddies, the sediments are all the fine sediments, and usually the gravels accumulate so much faster in the other parts of the basin, as they are so much coarser and more numerous than the fine sediments, that the eddy is usually left lower than the main channel or basin, and a time will be reached sometime when that difference in elevation becomes so perceptible as to deflect a portion of the stream into the pocket, and then the stream thus deflected would carry gravels and sands in and deposit them over the fine sediments, after which, the elevation having been built up by that method, the eddy would resume its normal condition, and the finer silts and clays would be deposited over the coarser silts, and that is my

[illegible] to attract for the film fiction a part of the
[illegible] over the period, but the usual possibilities would be such
as [illegible] only, or possibly that would be the same which is
[illegible] also by the Lake Geneva [illegible], which would be prac-
tically that [illegible] lake part of a short attempt to the [illegible].
[illegible] of the Inter Ocean [illegible] in all probability will
be the most of the [illegible] activities all in [illegible].

[illegible] it has [illegible] [illegible] year; the [illegible] year of Inter
Ocean [illegible], that is the [illegible] week [illegible] week;
week of it, however, as you say, we [illegible] in the week.

[illegible] if the [illegible] [illegible] the [illegible] will be [illegible] been
[illegible] to be [illegible] of a [illegible], or [illegible] such [illegible]
that the [illegible] was [illegible], as you say it is [illegible] [illegible]
[illegible] well, [illegible] it [illegible] be the [illegible] that the [illegible] at that
point [illegible] is [illegible] [illegible] of [illegible] and [illegible] [illegible],
it [illegible] is [illegible] to get a [illegible] [illegible].

[illegible] [illegible], or [illegible], [illegible] is [illegible] to the
[illegible], the [illegible] who all the [illegible] [illegible] [illegible],
the [illegible] [illegible] [illegible] [illegible] in the [illegible] part of
the [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
the [illegible] [illegible], that the [illegible] is [illegible] [illegible] [illegible]
the [illegible] [illegible] or [illegible], [illegible] [illegible] will be [illegible] [illegible]
[illegible] when that [illegible] [illegible] [illegible] [illegible] [illegible]
as to [illegible] a [illegible] of the [illegible] [illegible] the [illegible], [illegible]
[illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] the [illegible] [illegible], [illegible], [illegible], [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

notion of the way that was formed.

Q. Wouldn't it be a more likely condition, a more reasonable explanation of the condition which you say existed in the 16th~~street wells~~ Haskell well, if there had been, as I suggested before, a free discharge of water to the south, through something of a gorge, through that Red Hill formation, and that after the water had flowed there for a while then turning off to the west, and leaving that to be filled up, and then those deposits of the red alluvium being washed down in there, and allowed to remain in the old dry channels, alternating with the shifting current from one side to the other, might not that material there have been built up that way in those wells under such a flow to the south, rather than on a deflected flow to the west?

A. There is one strong fact which negatives that assumption, and I will refer to it: the Red Hill immediately south of the Haskell wells is prolific in the ancient formation in rising water, at the Y tunnel and the Cucamonga Springs; now, if that condition you speak of had existed there would be a duct or channel right through the ancient formation there, and as we do know that the recent formation is very deep at the Niche Well below that point; and that hypothetical duct would discharge the water through into that recent formation, and there would be no springs at the Red Hill; as the springs are formed by the outcroppings of the folded veins in the ancient formation, and not by straight channels which have not been folded, if those were straight channels which had never been folded, the water would simply pass through the same as it would a pipe through

a dam, and would discharge into the coarse formation below the Red Hill.

Q If there had been such a channel between the Red Hills, and that channel had become obstructed by a slide or fill, or anything which prevented the water from flowing freely down below a certain point, and afterwards that channel had become overlaid above, over the free portion,, wouldn't that then permit of the rising springs?

A No; because a slide would only affect the surface; a slide could not penetrate below the surface; as I understand you, you are assuming a channel straight through it. No matter where the slide occurred, it would leave the gravel coarse under the slide and there would be the out-let which I referred to.

Q When the water was flowing in the olden times, before the uplift of the red alluvium, before that folding occurred, what was the general course in which the streams flowed at that time, if you know?

A I think they were generally the same as they are today; that they were flowing to the south, southeast and southwest, depending on the local elevation of the debris cones then forming.

Q And the general tendency, of course, would be to the south?

A Yes, the general tendency would be to the south, the same as at the present time.

Q And when that uplift occurred, that was a vertical uplift?

A It was a vertical uplift; it was due to lateral pressure,

the same as you take a sheet of paper and apply pressure to it it will wrinkle the paper and make depressions at some points and elevations at the other; and at the summit of the Red Hill the movement was upward, while between the Red Hill and the mountains in the syncline of the basin, the movement was downward, illustrating it by taking a sheet of paper and compressing it at both ends, until it wrinkles.

Q That movement, whether up or down, simply changed the grade or grades but not the course of the existing deposits?

A Yes; that is, it would not change the direction in which the veins had originally been laid down; it merely folded the veins, changed their elevations above sea level, relative elevations at different points.

Q And I have understood you to say that in your opinion the general trend of the ducts in the old formation is from the north-east to the southwest, going toward the Cucamonga Springs?

A Well, some of the ducts are in that direction; others were laid down when the stream flowed at a different axis and would point more nearly to the south. Still others are laid down, say from San Antonio Canyon which would point southeasterly; so that there would be ducts at different elevations pointing in different directions, but they are all folded in the same manner as the Red Hill is folded throughout.

Q And the tendency is against any transverse movement of the water; that is, the tendency is to follow the line of the ducts and not across them?

A The tendency is always to follow the line of the ducts;

and were it not for the fold which raised the level of the ducts at some points much higher than they are above, there would be no appearance of water at the Red Hills; those channels would run on down to the axis of the main valley at the Santa Ana River, and there would be no springs at the Red Hills; and what makes the Springs at the Red Hill is merely this folding which elevated some of the ducts so high that on account of the rupturing, fracture, or the denudation subsequently of the formation, they would break through and appear on the apex of this fold.

Q Now with ducts laid down in a southerly direction and simply uplifted but still preserving that same southerly direction in the main, how do you make it probable that the water in those ducts, say from the Iosmosa Well and the Lone Star Well, and other wells lying to the northeast, that the water should be flowing there to the south-west on an angle or transverse course to the line in which those ducts were in all probability originally laid down?

A If you refer to that part of it, those would be ducts which were laid down either from Deer Canyon or from Day Canyon, and the original course in which they were laid down was not south but south-west. I don't believe that any duct from Cucamonga Canyon could pass through both the Lone Star tunnel and the Y Tunnel and the Cucamonga Springs. But ducts from Deer Canyon and Day Canyon could do so.

Q Why not from Cucamonga Canyon?

A Because if you lay your rule from the mouth of that canyon in the direction in which the water must have flowed,

if you pass through the Lone Star Tunnel on the thirty-five acre tract, you would leave the Y Tunnel to the south-west, and you would also leave the Cucamonga Springs to the south-west, and as I have explained the transverse movement of the water between the ducts in the ancient formation is probably extinct on account of the decomposition and age of that deposit as well as the preponderance of fine material; ~~xxxxxxxx~~ whatever relation there is between the Lone Star Tunnel and the 35-acre tract and the Cucamonga Springs and Y Tunnel, is due to the ducts which come from either Deer or Day Canyon, and not from Cucamonga Canyon.

Q But by far the larger amount of the water that is flowing down across this section here, in all probability, we might say almost a certainty, came from Cucamonga Canyon, did it not?

A I have given those proportions, and I think they do show that the larger proportion of any canyon tributary to the whole formation is from Cucamonga Canyon, namely, showing that on the Arrowhead curve there would be 364 inches --

Q That is about the present: I am talking about the discharge from those canyons before this uplift of the old alluvium, before this obstruction existed, was not the natural tendency of the water to take a short cut away from the mountains and flow to the south?

A I believe then, Mr. Goodcell, that it was according to the same law as it is now, namely, that the debris cone had a swing from one side to the other, and as the elevation was built up in the center, assuming that we begin in a straight southerly course, which would be the first course, when they

had built up so high that the elevation on each side was very much lower, the stream would shift and flow to the other side channel; and I think the same law has prevailed from the beginning, ever since this mountain range attained its identity.

Q But still the larger flow and the larger channel would be on the more difect southerly course than on the side courses?

A While the channel is flowing there it would, but when the channel has shifted to one side or the other, that condition would be reversed; as you can see now, at Day canyon, at the present time, the large flow of Day Canyon is on the west side of the debris cone; that happens to be the condition, instead of in the center directly to the south. Now I think those conditions have existed through all ages, ever since that mountain range became a separate identity in the topography.

Q Now the place where the Sixteenth Street wells were situated, the place where the Y Tunnel and Cucamonga Springs are situated, is in almost a direct course from Cucamonga Canyon?

A Well, the Y Tunnel is considerably to the southeast from the mouth of the canyon. As you see by laying the rule on there it is very much to the southeast. The Cucamonga Springs are about the letter R in "red" there; and you see both of them are very much to the southeast of the canyon. I think even the Sixteenth Street well No. 1, which is the most westerly one, and the Lady Tunnel, are a little to the southeast; not very much. I think a line along there would pass

west of all of the wells and developments.

Q But it is not half as much to the east as it would be to the west from Deer Canyon, is it?

A No, it is not so much of an angle to the east as the angle would be west from Deer Canyon; the proportions are less.

Q Why is it, Mr. Finkle, that before this Red Hill formation existed, when these old ducts were being laid down, before there was an obstruction to the free flow of the water according to the natural direction which gravity would give it, why is it that there should not be ducts leading from the Cucamonga water into the old formation?

A I think there are; I believe there are ducts leading from the Cucamonga water through the old formation to both the Y Tunnel and the Cucamonga Springs; I also believe that there are ducts from the Deer Canyon leading through the same formation to those places. I don't think the Cucamonga Springs are fed from one canyon alone; but I believe they are fed from sources including both Cucamonga Canyon, Deer Canyon and Day Canyon, and possibly also some from San Antonio Canyon.

Q But isn't the natural inference that the larger supply comes from Cucamonga Canyon which is the nearest and naturally in the most direct line for the water to travel?

A I don't believe that the figures I made would bear that claim out.

Q I am now speaking about the time when the old formation was laid down. Of course you haven't any figures on that.

A Well, the figures would be based on the same ratios, because when the old formation was laid down the debris cones were built up in the same way as they are today, and the stream would change from one side to the other in about the same manner, and my figures which I testified to in regard to the modern division of those water supplies will apply in the same ratio to the ancient division through the old alluvium.

Q Don't you know that the present flow from those channels, the direction and course and proportions has been changed materially by the obstruction which has existed by reason of the Red Hill?

A I think it has in the recent alluviums. That is what shifts so much water in the recent alluviums to the west, by reason of the dike formed by the Red Hills; but that does not alter what I said, that in building up the ancient alluviums that in the swing of the arc, the swing would be the same as it is today, and that being true, those channels would first flow on one side and then on the other side, alternating back and forth; and what we can observe at the present time is merely an illustration of that, as even during historic times those streams have made such changes.

Q Then you will give it as your opinion, will you, that the most prolific ducts, those that carried the larger supply of water in the olden times, were those that came on the largest angle from the mountains, and from the canyon or stream that had the smallest supply of water?

A No; I don't wish to be understood as giving that as my opinion. I merely wish to state that the proportions are a-

about the same as I have given in my figures; that is about the nearest that I can arrive at it. Unquestionably, if you take Cucamonga Canyon as distinct from any others, I think that it supplied more to the ancient formation than any of the others, in the building up of it, as well as the quantity of water supply.

Mr. Goodcell: That is all.

Mr. Curtis: Q Mr. Finkle, there are one or two questions that I would like to ask you in regard to the formation of the ancient and recent alluvium that would perhaps clear the things in my mind if not in the mind of the court. I understood you to say that the ancient formation was laid down practically the same as the recent formation, that is it was caused by the water bringing down material from the mountains?

A Yes, it was laid down according to the same laws as the recent, but I have stated that the difference consists in the flatter grade at that time, as the mountain range was not so high, and that there was a greater preponderance of fine material covering the mountains, as it had been recently uplifted from the bottom of the sea so that the sea muds and silts would be found covering those mountains in their newer state.

Q After that was laid down, how did the water move through that? Was that a saturated mass, or was that as it is now?

The Court: You are speaking of the ancient formation?

Mr. Curtis: Yes, the ancient formation.

A Before it was folded?

Q Yes, before it was folded?

A Before it was folded it was not a saturated mass in the sense in which we speak of a saturated mass of gravel in the present recent formation, because there was so much fine material in it that only certain ducts or veins could circulate the water, and while the water was penetrating all the voids and filling the voids in the fine clays and silts between these veins, that water was instatic contact and not in circulatory contact, and I believe the water was circulating only through the veins of coarse material and filling the voids, practically in a state of rest, in the fine materials.

Q Then it is your opinion that that water always did move through this ancient formation, taking the courses of the ducts or channels rather than through it as a saturated mass?

A Yes, sir, that is my opinion; I think before the folding that it extended down to the f thalweg of the valley at the Santa Ana River.

The Court: Q That is about the same thing as the spillway for practical purposes?

A Yes, sir; or the main syncline of the whole valley, where the lowest dip is.

The Court: The valley discharge, I suppose?

A Yes, sir, it is derived from the German word, the path of the valley.

Mr. Curtis: Q Well, you think that through the recent formation that the water has ever passed through in channels and ducts, or is that an entirely different mass from the older formation?

A I believe that is very different on account of the conditions of the density of the material being reversed; in the recent material the material is principally coarse, the fine strata and lozenges being the exception, and that while there is a tendency at some points to create a guidance to the water in the way in which the material was laid down, that this is so imperfect as to make it practically a saturated mass wherever the saturation is complete in the mass.

Q Then water never did move in that older formation according to the hydrographic plane of the water?

A Not according to the hydrographic contours; it would be influenced more by the veins through it; and that hydrographic contour made in that way, would undoubtedly indicate the movement of the water, because it would show in each of the veins a dipping of the contour when you connect it with the saturation of the clay; that would be caused by the consumption of head in the veins due to friction.

Q Then is it your opinion that the water in that ancient formation flows today in accordance with hydrographic contours as shown on defendants' Exhibit Z 9?

A No, that is not my opinion, and in giving all my testimony relating to the outlet I ~~was first~~ confine my deductions wholly to those wells which were in the recent formation, because connecting them up with wells in the ancient formation would be somewhat irregular; and while the map is drawn to show both contours, the contours must be interpreted and understood by segregating those which are made from wells in the ancient formation from the ones which are made from wells in the recent formation.

Here the Court takes a recess until 2 o'clock p. m.

Afternoon Session

Cross Examination of F. C. Finkle, resumed.

Mr Curtis, Q. I believe you said that you had personal knowledge of one of the Haskell wells, number 7 or number 8 I don't remember which?.

A. Number 7, the first one drilled.

Q. Have you visited it, and measured the water while it was being bored, and after it was bored?

A. I don't feel sure that I measured it while it was being bored,- I think just before and just after.

Q. Just before what?

A. Before the drilling of the well was commenced.

Q. Measured it while it was a shaft?

A. While it was still a shaft, yes.

Q. And then measured it after it was drilled?

A. After the well was completed and perforated.

Q. How long had it been drilled and perforated?

A. Not very long; just a few days, because I went over there just especially to look at that well, that trip.

Q. Had it been pumped any before you got there?

A. No, sir; not any more than the sandpumping of the well-borer in drilling it.

Q. Don't that sometimes reduce the water in a well right after it is bored?

A. No, that does not reduce the water-level, because they can't take out any more than the contents of a small cylinder; and it flows in, below, so that it does not reduce the water any.

Q. Don't the water in a well quite frequently, just after

it is bored, lower rapidly for a short time?

A I never observed that as being the case, unless you should strike a stratum of less pressure below, and then that would lower it permanently.

Q But if you should strike a pocket of water, wouldn't very little pumping lower that?

A Well, pumping,- if the water supply is very limited, would lower it ofcourse; but if you strike any water and perforate the pipe, to get it in, the water will rise in the pipe, to the head of the water you strike and no lower nor higher; and in this case the well had been completely perforated and completed, and there was nothing further done to it afterwards.

Q You strike those pockets of water, in artesian formations only, do you?

A That is the only place that you can strike any pockets of water, except in artesian formations sometimes the veins are cut off one from the other, and have no supply or outlet, and in that event you simply strike the water of saturation, in the pocket; in the plane of saturation you strike merely lozenges of clay, and after you go through you are still in the same plane of saturation, and you don't ever strike pockets of water in saturated planes.

Q In saturated masses?

A I don't know of any case in which that has been done; you might conceive of a kidney with a porous core in it having been built up, and in that event you might do so.

Q That would have a tendency to raise the water in the well would it?

A No, because that kidney would only have the same pressure around it as the plane of saturation woul have, and the well at that point, so that it could not raise the water unless you struck a vein under pressure.

Q Now, on Defendants' Exhibit P,- as I understood you to say, the water fed the Cucamonga Springs from these four canyons; I wish you would indicate on Defendants' Exhibit P. the point where the Cucamonga Springs are?

A Approximately the Cucamonga Springs are located in the vicinity of where the large letter "R", is, in the first letter of the words "Red Alluvium", on the east side.

Q Now, there couldn't be any water that would come from San Antonio Canyon, that would pass through the Sunset wells or the veins feeding the Sunset wells, and the Cucamonga Springs?

A No, therecould not.

Q Could there be any from the Cucamonga Canyon?

A No, sir.

Q Could there be any from the Deer Creek Canyon?

A There might be, because the Cucamonga Springs covers a considerable area, and the lower part of the Springs would undoubtedly be below that letter R, which I have referred to, and it is possible that the very lower part of the Springs --

Q Do you think that the Springs would extend clear down to the bottom of that red mark there, or red alluvium place marked on this exhibit?

A No, I do not; but I think they extend pretty well down to the lower part, , and also that the channels are not always perfectly straight; these channels, while they are spoken

A. Sir, Madame Lupi (Jenny) would only take his word pro-
vided it is the place of Mademoiselle Prudence, and the
wait of such valid, so that it would not claim the being ac-
have not already a very minor pressure.

Q. Yes, so Mademoiselle Prudence, I understand you is
say, the order had the Dauphine Quelque from time the
reason; I also you would instead to Mademoiselle Prudence,
the with there the Dauphine Quelque and?

A. Especially the Dauphine Quelque are located in the
vicinity of about the large letter "C", in, in the Gra-
bation of the words "Sud District", on the mid-side.

Q. Sir, Jenny Prudence's is any other that would see from
the Jenny Quelque, and would you bring to Jenny with
it the will Prudence the Sudent Yelle, and the Dauphine
Quelque?

A. No, Monsieur sud.

Q. Which there is any Jean the Dauphine Jenny?

A. No, Sir.

Q. Would there is anything the Jean Jenny Dauphine
A. There might be, because the Dauphine Quelque Prudence
considerably are, and the Jean Jenny of the Yelle would
necessarily be by the Sud letter E, while I have reported to,
Q. It possible that the any Jean part of the Quelque —
A. It was found that the Quelque would where Jean from be
the course of that the Sud Jean, or the Mademoiselle Jenny
where the Jean wanted?

A. Yes, I do not; but I think that where probably will Jean be
the Jean Jenny, , and also that the Prudence are not Jenny,
probably already have Jeannette, while they are where

of, in a general way as straight lines, undoubtedly do make deviations, the same as surface channels do today, to a small extent; and I wouldn't want to say that based on this map, particularly as the location of these wells is probably not accurate to a gnat's heel on this map; I think it would be likely that some water from Deer Canyon would pass through a vein that would cross the Sunset wells, or one of them, and emerge in the vicinity of the Cucamonga Springs.

Q Supposing that "R" represents the location of the Cucamonga Springs, would any water from the Deer Canyon pass through the Sunset wells, and Cucamonga Springs?

A It is not improbable that the channel would be both wide enough ~~and deep enough~~ or crooked enough to do that, and I wouldn't say that that is impossible.

Q You would not say it is impossible?

A No.

Q Wouldn't you say it was improbable?

A Well, I would hardly want to go that far, because while we draw a straightline to indicate these things, there is no doubt there will be some lateral variations from the straight line, and the amount of leeway we have here is so close, and the inaccuracy of platting may make up for that, may be sufficient to make up for that.

Q Well, this is an exhibit presented by the defendants and supposed to be accurate,- presented by the defendant the San Antonio Water Company.

A I know; it is supposed to be as accurate as can be made on a small scale like this; I don't wish to have record as saying this without having made a careful survey on the

ground at least.

Q Suppose Exhibit F is an accurate representation of the country in the vicinity of the Red Hills, and that the Sunset wells are accurately located as shown on Exhibit F, and that the Cucamonga Springs are at the point marked "R", in the word "Red", is it possible, Mr Finale, for any water from the Deer Creek Canyon, to pass through the Sunset wells, and also the Cucamonga Springs?

A Yes, that is possible, because the channel might be that much crooked, without much trouble.

Q It would have to get a pretty good curve on it?

A Well, it would have to have more of a curve than that; those channels do have bends in them.

Q It would have to run uphill wouldn't it?

A Well, water runs up hill when it is under pressure; and in the original laying down of the strata it wouldn't have to run up hill; it would simply mean that the stream had meandered a little when this formation was deposited.

Q When this underground channel or duct that you speak of was formed, it wasn't under pressure then?

A No, sir; it ran by gravity then.

Q It couldn't have run uphill then?

A No, sir; and it didn't have to run up hill to meander to the south a little; if you draw a line passing through those two wells, starting here, it is readily conceivable how a channel without any marked bends in it, could run through both the points mentioned by you, from the mouth of Deer Canyon.

Q Then coming to Lytle Canyon, I wish you would put your rule

on the mouth of the canyon there, and also the letter R and the Sunset wells.

A In that case, you could pass through both Sunset wells in a straight line, from Day Canyon.

Q But in doing so, youmhave to run almost to the northern or uppermost limit of the debris cone issuing from Day Canyon?

A You have to run from the mouth of the canyon, where we have made the pivot; that is the point where I have drawn all the lines from.

Q Aas I understand, this red line running from the mouth of the Day Canyon southwesterly, is the uppermost or northwesterly-most limits of the debris cone of the Day Canyon?

A Yes; that line is made straight; it is hypothetical; ofcourse it was made more in the form of a fringe when it was laid down; that is as near as it can be located.

Q And to pass through either one of the Sunset wells and the Cucamonga Springs, you have to run on the most northwesterly limits of the debris cone?

A Well, you don't have to, if you wish to make the pivot somewhere else; you canmake the pivot lower down in the wash; you can make the pivot there if you wish to; in making this out I ran to the limit where the divergence had occurred first.

Q That is the point we have to take in this case, the most direct point to measure from?

A That is the maximum point to measure from as I understand.

Q Then you say it is possible for some water from Day Canyon to pass through the Sunset wells, and also the Cucamonga Springs?

on the south of the canyon rim, and also the latter's and the Tonnel walls.

A. In that case, you could pass through this Tonnel-wall in a straight line, from the Cayon.

Q. But in doing so, crossing in the shortest or upper-most limit of the dolmin cone leaving from Gay Canyon?

A. Yes sure to cross the south of the canyon, since we have made the plot; that is the point where I have issued all the lines from.

Q. Now I understand, this end line running from the south of the Gay Canyon westwardly, is the upper-most or north-westerly-most limits of the dolmin cone of the Gay Canyon?

A. Yes; that line is quite straight; it is hypothetical; of course it was made plain in the form of a drawing when it was laid down; that is as near as it can be laid.

Q. And to pass through either one of the Tonnel walls and the Canyonga Tunnel, you have to pass on the most northerly limits of the dolmin cone?

A. Yes, you don't have to, if you wish to make the plot somewhat wide; you consider the point lower down in the wall; you can make the plot larger if you wish to; in cutting this out I was in the Chair where the disagreement had occurred first.

Q. That is the point we have to take in this case, the most distant point to measure from?

A. That is the maximum point to measure from on Tonnel.

Q. Then you say it is possible for more water from Gay Canyon to cross through the Tonnel wall, and also the Canyonga Gorge?

A. That is not only possible, but very probable.

Q. As I understand you to say these channels or ducts were laid down in the shape of a fan, you may say, and some overlying the other? They were not all on the same plane?

A. No, not all on the same plane, no; they were laid down on a fan.- on the surface of a fan, and the main channel would shift away, and during that time the fine sediments would come down by lateral flow, and lighter flow, from the mountains, and cover them over with a fine sediment, enclosing them in that manner.

Q. We will take for instance Deer Canyon, and there would be a channel come down from Deer Canyon, and we will say that it ran right in the direction of the Sunset wells, and at the same time there were channels we will say issuing from Cucamonga Canyon, and there might be a channel years afterwards running from the Cucamonga Canyon, right through the Sunset wells might there not?

A. Yes, sir; there might be, and probably are, some old ducts which have passed through the Sunset wells at different elevations that the ones that came from the Deer Canyon.

Q. When you strike water at the Sunset wells, do you know whether you get that water from a channel coming from Cucamonga Canyon, from Deer Canyon, or from Day Canyon?

A. No, sir; I don't know that; and I don't even know whether they are junctions or components of all the canyons.

Q. So if it was possible for a channel to pass from the mouth of the Day Canyon through the Sunset wells and also the Cucamonga Springs, and you bored a well at the Sunset wells, where the Sunset wells are bored now, and struck water

A. Think it was fairly pleasing, but very questionable.

Q. Was I mentioned you in my house somewhere in Santa Ana said down in the shape of a fan, practically, and were wrapping the mirror? They were not flat on the wall?

A. Oh, not all in the same plane, no; they were held down in a fan - on the surface of a fan, and the main dressed would fall away, and during that time the fan mechanism would come down by internal fan, non-flicker fan, from the mechanism, and there was never only a time sequence, including time in that manner.

Q. We will take for instance Lower Sherry, who there would be a dressed in an Oriental Dancer, and we will say that in the right in the structure of the dressed really, and at the same time there were mechanics in will my inside from Oriental Dancer, and there might be a dressed place attached inside dressing from the Dancer, right through the dressed really right there.

A. Yes, sir; there might be, and probably was, some odd change which have passed through the Dancer will be different displacement that has come into Lower Sin Inner Dancer.

Q. Then you maintain what is the Dancer will, do you know whether you got that what is dressed coming from Oriental Dancer, Lower Inner Dancer, or from her Dancer?

A. No, sir; I could know that; and I don't know how anyone that was involved or responsible of all the dancers.

Q. If it was possible for a dressed to come from the mask of the Dancer through the dressed with the Dancer Sin, and you dressed a will in the dressed really, where the dressed really are dressed too, and which was

you wouldn't know whether that water came from Day Canyon, Deer Canyon, or Cucamonga Canyon?

A Not from the mere fact of striking water, I wouldn't know anything about it.

Q Now, if that came from the Cucamonga Canyon, then it was not water that ever fed the Cucamonga Springs?

A No; because the duct would point in a different direction from the Cucamonga Springs, and it would have to be water which was not tributary to the Cucamonga Springs.

Redirect Examination.

Mr McKinley, Q You were asked about the effect of the decrease of water upon your calculations upon which the Exhibit Z1 was based: What effect would the decrease of water have upon those calculations?

A As shown by Exhibit Z1, and taking the lower observations when the depleted head is supposed to have occurred, following out the green line, for example, which is based on coefficient E, on the May 7, 1904 measurement, we see that the divergence between the 1904 and the 1906 measurement on that coefficient is very great, while the lowering of head between those two dates is extremely small, and would indicate, if the variation were due to any change of porosity in the soil, a most rapid change in a very short distance; so rapid, in fact, as to create a suspicion that such an assumption is entirely erroneous. And upon following up the green line to a point opposite the measurement July 29, 1906, it is found that the calculated result is 13.29, which is nearly double the actual flow, although there is a variation of 5.1 feet in the level at well number 7, and .3 of a foot in the square

root of the head at well 7, while there is almost one hundred percent. increase in calculated result over the measured result; that in itself would be a refutation of any variation between the calculated and observed results due to any change in porosity of the soil in such a shallow silt soil stratum, where the soil is laid down especially by running water.

In addition to that, the assumption that there is a variation in the soil, and therefore the coefficient of resistance is changed, are the measurements which I gave to Mr Goodcell yesterday, by which only a single measurement shows any correspondence with the head at the time of six different measurements; I also have two more, one made on the 7th of April, 1909, when the hydraulic head at well number 7, or elevation of water at well number 7 was 1375.1 feet, and the discharge of the Cucamonga Springs and I tunnel was 62.84 inches. While on May 27, 1908, the head or elevation of water at well number 7 was 1375 feet, only .1 of a foot less than it was on April 7, this year, as shown on page 2544 of the transcript; while at that date the discharge of the Cucamonga Springs and I tunnel was 47 1/2 inches, as shown on page 2525 of the transcript, in this case, showing a very radical difference between the discharge on the two dates, while the head on those dates stood within .1 of a foot of each other; and on neither of those dates was there any pumping at well number 7, which would show that some other condition than any change of porosity operates to refute the theory that the hydraulic head at well number 7 influences the water discharging from Cucamonga Springs.

Now, I have looked up also the dates on which there was any pumping, and on which there was no pumping in the measurements I gave to Mr Goodcell, yesterday, and I find as follows:

That the first set of measurements which are compared, of May 20, 1905, and February 14, 1906, there was no pumping.

That the second set, of May 7, 1904, and September 29, 1906, there was no pumping.

The third set on August 5, 1905, and March 7, 1906, there was no pumping.

Also the fourth set, on March 30, 1908, and March 15 1909, there was no pumping at well number 7, or in that neighborhood, of well number 8; which applies also to the others.

That on the one given for October 21, 1907, and December 6, 1908, there was pumping from October 17 to October 19, at well number 8, and also some on October 21; so that one is subject to the pumping conditions. On that date - the discharge at Swamp Springs was practically the same on both dates, while the head was also the same, being the only measurement showing such correspondence of all I have given.

In the last one which I gave yesterday, comparing May 11, 1908, and October 9 and September 26, 1900, there was pumping on October 9, as shown in the transcript, there being 34.65 inches pumped from Cottrell well 1, well number 7; now, comparing with that same measurement of October 9, 1900, and the discharge measured by Mr Wright, September 26, 1900, on the east side, the last measurements which I took on April 7, 1909, I find that on those two dates the hydraulic heads

corresponded within 1.7 feet at well number 7, while in 1900 the discharge was 126.75 inches, and on April 7, this year, the discharge was 82.84 inches, showing a very large discrepancy in the discharge, with only 1.7 feet difference in the hydraulic head.

Now, here we have eight comparisons taken from the transcript, at which the hydraulic head was either practically alike, either identically alike or almost alike, and in each the ~~condition~~ discharges varied within limits of as much as 40 or fifty percent, in some cases,- yes, in one case it varies within limits of nearly eighty percent, and in only one case out of these eight comparisons is there any close correspondence of the discharge, while in every one of the other seven, there is a radical divergence of the discharge with the level in well number 7, comparably; that negatives the assumption that there is any change of porosity of this strata which would defeat the application of the rule as I have applied it from my rational formula, or as I might apply it from the empirical rule to which Mr Hazell referred in his cross examination.

Q. You referred to the fact while you were testifying on cross examination. that at times the hydraulic head at well no. 7 has been below the point of emergence of the water at the Y Tunnel. What if any bearing did that have on your calculations?

A. I didn't say that that had any bearing on that subject, because the Y Tunnel is only one part of the point of emergence, and all of my calculations are based on the point at which all of the water has emerged and the frictional resistance to that point; and further, that my whole analysis, including the one on Z-1, as well as those given subsequently as comparisons of levels in well no. 7 and the discharges which I gave yesterday to Mr. Goodcell, was simply put up to negative the theory that that well regulates the discharge. That is not my theory, and I believe a complex system of circumstances in fact regulates the discharge of Cucamonga Springs, and well no. 7 has nothing to do with it. These facts are put forward wholly to negative the contrary assumption.

The Court: Negative that assumption, you mean? You say to negative the contrary assumption.

A. Negative the assumption contrary to my assumption. That is to say, to negative the assumption of plaintiffs that well no. 7 does have any bearing on the discharge of the Cucamonga Springs.

Mr. Haskell. In your testimony a few minutes ago, in one comparison you made, it was with the Cucamonga Springs. Now, when you used the expression Cucamonga Springs, did you also include the Y tunnel?

[illegible]

A I don't include the Y Tunnel except on dates when the Y Tunnel is flowing. When the Y Tunnel is not flowing I mean the Cucamonga Springs; and when the Y Tunnel is flowing it is included.

Q And when you do include the Y Tunnel, do you always say the Y Tunnel?

A I may have possibly omitted to say so. If I have omitted to say so, the record of the testimony will show from the measurements whether the Y Tunnel was flowing anything or not on that date.

The Court: As I understand, all the estimates and theories you advance are based on an inclusion of the two?

A Yes; I always considered the two as being considered by everyone from the same source. That is the way I considered them, judging from the exhibits and measurements in the case.

Mr. McKinley: Q What if any bearing does the point of emergence have on your calculations?

A That does not bear on the calculation. After it was diverted in the pipes, you may take it down, and include your coefficient of resistance in the pipe, and your calculation would still be correct, because your coefficient, whatever it may be, includes all the resistance to the point where you measure the water. And whatever complex or multiplied condition of affairs regulates that resistance, is all considered in the coefficient.

Q You referred to some calculations made on the Poiseullian law. What calculations have you made?

A I took an empirical rule which was determined by

Poiseulle which differs from my rational equation in being determined wholly by experiment in capillary tubes, making the flow or attempting to make the flow vary strictly as the pressure, the calculations, whatever they are, as to square roots of heads, and other conditions, being embodied wholly in the coefficients. Now if we take that law which is the same as the Darcy law or Meyer law, divide the discharges by the pressures, we derive the relation which that law shows from these results on Exhibit Z-1. Taking the discharges in cubic feet per second and dividing by the pressure in feet, on

November 22, 1908,	.009
February 2, 1908,	.01135
January 9, 1908,	.00972
September 19, 1907,	.00837
July 29, 1905,	.00258
May 7, 1904,	.00443
February 3, 1900,	.03282
March 15, 1909,	.01636

These are arranged in inverse order except the last one, simply because they are given that way in my book.

Now comparing those results and taking the highest and lowest result, we find that the ~~xxxxx~~ one on February 3 would have to be increased 1172 per cent. in order to equal the one-- I think I am stating that wrong. We find that on July 29, 1905, it would have to be increased 1172 per cent. in order to equal the one of February 3, 1900, while the pressure, ~~xxxxxxxxx~~ itself between those dates only increased 85 per cent. That shows that the result obtained by this law if that be invoked, disproves the theory still stronger than

my rational formula.

Q You mean it disproves the theory that there is a relation between well no. 7 and the Cucamonga Springs?

A It disproves the theory that well 7 has any effect on the discharge of the Cucamonga Springs, according to the Meyer law or the Pisculllian law referred to in the report ~~to p~~ of the government.

Q Have you made a further comparison between well S and Haskell Well no. 7?

A I have.

Q That is, Haskell well no. 1--

A That is well no. 7 in the series in this case.

Q You can give your comparison.

Mr. Britt: This is not re-direct, and I suppose we will be allowed the same latitude on cross examination.

Mr. McKinley: We won't make any objection to your cross examining him on anything he says.

A Referring first to the relation of those wells as shown on page 89 of the Reporter's transcript, when on May 12, well no . 7 stood 2.3 feet higher than well Sor Hellman well no. 2, while on May 19, before the pumping began well no. S had increased .1 of a foot in its elevation and well no.7 on that date was only 1.8 higher than well S, showing a change in relation of .5 of a foot in a week when there was no pumping between those wells.

Then proceeding to the place where the pumping stopped, on January 9, and referring to defendants exhibit J, showing daily rainfall for the season of 1904--05. we observe that on January 9 there awas a rainfall of 2.36 and that the

wells rose. The argument is whether the stopping of the pumping did the raising or the rainfall; and as at other times the rainfall has been showing an effect on wells, I adopt the more reasonable deduction to my mind and assume that the rainfall made the change on that date.

Then turning to page 93 of the Reporter's transcript and also turning to plaintiffs exhibit 3, the measurements of the Hellman well marked in the second to the last column.-- referring to that, we find that taking the figures on page 93 of the transcript on August 5 and also for August 16, which are separated by nine days, between which the pumping began on the 13th of August, that there has been a fall in Hellman well no. 2 or well S from the last previous measurement on July 29. But there are not sufficient measurements to determine whether the fall began before the pumping or since, and therefore, going to exhibit 3, we find that beginning with August 11 there was a slight dropping of Hellman well no. 2-- No; I am wrong in that. Beginning earlier than that, beginning on August 5, the west Hellman well on exhibit 3, which is given in the column next to the last, shows a measurement from the casing to the water on August 5, 1905-- I will take the August 7 item. The figures are so dim on this. Beginning with August 7, 1905 the distance to water in the Hellman well no. 2 was 22.24 feet from the top of the casing. On August 8 it had fallen to 22.28; On August 9 it had fallen to 22.37; August 10 it had fallen to 22.49; August 11 it had fallen to 22.57 feet; on August 12, 22.65. And then if you pass to the 14th, there being no measurement on the 13th, it has fallen to 22.81

This showing in the plaintiffs exhibit demonstrates that the dropping of that well started a week before the pumping and the argument based on page 93 of the transcript that the pumping was the cause is defeated by this exhibit 3, as the drop had begin before the pumping. Just one more point on that well, and my answer is complete. Referring to page 2544, I find measurements of Hellman well no. 2 or well S and well no. 7 at the head of that page, February 2 to and including February 29, and I find that well 7 on the second of February stands 5 feet higher than well S, which is higher than it was ever known to exist or shown by the previous ~~xxxxxxx~~ tables. On the 19th of February it has gained a foot over well S or Hellman well no. 2, and on the 29th of February it has gained another .9 of a foot, or well 7 has ~~8~~ 6.9 feet higher elevation than well S or Hellman well no. 2.

Mr. Britt: Give the elevations of those two wells.

A February 2, well no. 7, 1368.8;

Well S, 1363.8

February 19, Well 7, 1370.7

Well S 1364.7

February 29, well no. 7, 1371.5

Well S 1364.6

That shows a very much higher plane in well no. 7 as compared with well S to any of those which we have referred to in 1904 before the pumping, when the difference was 2.3 and 1.8 feet, and demonstrates a lack of any relation between those two wells.

Mr. McKinley: Q Have you made an examination of the meas-

urement of wells no. 5 and well no. 7 or Haskell well no. 1?

A I have no additional measurements, but I have the measurements given by Mr. Trask.

Q I am not asking for additional measurements. I ask you if you examined those measurements.

A You are referring to well no. 7?

Q Well 7 and well 5. State whether in your opinion they are in sympathy.

A There is no indication of their being in sympathy.

Q Give your resons for your opinion.

A Taking the year 1904 when well 8 began pumping on the 19th of May, well no. 5 stood 1366.2 on that date and well no. 7 stood 1347. In the next week, on the 26th of May, well 7 had declined 3.2 feet.

Mr. Britt: Will you give us the elevations?

A The elevation of well no. 7 was 1343.8, a decline of 3.2 feet. Well no. 2 was 1366 feet.

Mr. McKinley: Well no. 2?

A Well no. 5-- Pardon me. I gave the wrong well in the answer.

Q I want you to compare well no. 5 and wells no. 7 and 8; or, if your comparison runs only to 7, give that.

A Part of the answer should be stricken out; it refers to another well. I will begin over. Taking well no. 7 on the date of May 19, the elevation was 1347.0; May 26, 1343.8; a decline of 3.2 feet. Well no. 5 on May 19 was 1348.1 feet, and May 26, 1346.2 feet, a decline of 1.9 feet.

Taking the next date, June 2, well no. 7 was 1343.3, a decline of .5 of a foot since May 26; while well no. 5 was

1346.3, an increase of .1 of a foot since May 26. Then taking June 11, another week later, well no. 7 stood 1342.1, a decline of 1.2 feet in well no. 7. Well no. 5 stood 1346.8 feet, an increase of .5 of a foot that week, in the opposite direction from well no, 7. And from that time on to June 18 (another week) well no. 7 had declined .3 of a foot, being then 1341.8 feet, while well 5 stood on June 18 1345.2 feet, a decline of 1.6 feet. Those figures are given on pages 88 and 89 of the transcript.

At that time I refer you to page 82 of the transcript, and we find that well no. 8 began pumping at 10;35 a.m. on May 19, and that well no. 3 began pumping at 5 a.m. on June 16, two days before the last measurement. And the comparisons I have just made show that when well no. 7 was falling in sympathy with the pumping of well no. 8. well no. 5 was the most easterly of the 16th Street wells and was varying in a different direction and in fact rising, and did not begin to fall until well no. 3 started to pump on the 16th of June of that year. And upon such comparisons as that I base my conclusion that well no. 5 and well no. 7 and 8 are not in sympathy or relation one ~~with the other~~ way or another.

You have used the phrase "sixteenth street wells" frequently during yourexamination: To what do you refer as the 16th Street wells?

I refer to the 16th Street wells as wells 1 to 5 when I refer to the class of water and the conditions governing the wells; and if I have used the word in any other manner by inadvertence to include the two Haskell wells, or well

no. 6, that is undoubtedly shown by the context; but as I have always noticed it well no. 6 was not used for anything except to irrigate the Rubio place. and I never classed it with the 16th Street wells; and in the same way, I never classed the Haskell wells in that manner. I may have used the phrase, Judge McKinley, as expressing 7 and 8 with the others in some of my testimony. If so, the context will show it.

Q But ordinarily it has been used only to refer to the five wells?

A Ordinarily that is the rule I have followed.

Q Have you figures as to the average supply produced from wells no. 3 and no. 7, discussed by you somewhat with Mr. Britt in his cross examination?

A I have the computations made on the testimony. Do you wish those?

Q Yes; if you please.

A Beginning with the year 1900 the average of water pumped from well no. 7 which was then the only Haskell well was 109.45 inches; while for the year 1900-- the same year the average pumping from well no. 3 was 74.11 inches. Taking those two as standards of comparison, I made the following averages and comparisons for each year: 1901, well no. 3, 69.5 inches, ~~xxx~~ ~~fx~~ which is 93.7 per cent. of what it pumped in 1900. Well no. 7, 67 inches, which is 61.2 per cent. of what it pumped in 1900. 1902, well no. 3, 70 inches, which is 94.4 per cent. of what it pumped in 1900. No measurement of well 7 or 8. 1903, well no. 3, 60.8 inches, which is 82.4 per cent. of what that well pumped in

1900. Well no. 7 or well no. 8, whichever was pumping from the Haskell wells, 91.2 inches, being 83.3 per cent. of the Haskell discharge in 1900. 1904, well no. 3, average of all the measurements in the case, 53.03 inches, which is 71.5 per cent. of its average in 1900.
Well no. 7, 73.83 inches, which is 67.3 per cent. of its discharge in 1900.
1905, well no. 3, 59.41 inches, which is 80.1 per cent. of its 1900 average
Haskell well, 68.57 inches, which is 63.2 per cent. of its 1900 average. 1906, no pumping at either well. 1907 no pumping at well no. 3; but the Haskell well, 73.8 inches, which is 67.3 per cent. of its 1900 average.
1908, well no. 3, average 65.25 inches, which is 88.4 per cent. of the average flow for 1900. Haskell well, 57.57 inches, which is 52.6 per cent. of its 1900 average.
Taking each well for the entire time, the average of well no. 3, subsequent to 1900, is 63. inches, which is 85.1 per cent. of what it produced in 1900. And the Haskell well, 71.99 inches, which is 65.8 per cent. of what it produced as an average in 1900, demonstrating that the shrinkage in the Haskell well has been on an average 19.3 per cent. higher since 1900 than that in well no. 3.
Mr. Finkle, in your cross examination the following question was asked you and answered, on page 4170:
"Q And the consequences are, in your view, that whenever a point is reached by the cone of depression of a pumped well which touches a line horizontal with the flow of water in all the other wells, springs, streams and emergenc-

es of water in the neighborhood, they will cease to flow a and the water makes a bee line to the well.

"A The truth is they would cease flowing if the pumping is in porous gravel like these in 16th Street. If you have it in compact clay, I admit there is a very different condition. But I am speaking of the very porous gravels on 16th Street." I ask you whether you intended by that to give any opinion that the cone of depression in the 16th Street wells in any way affected then tunnels and wells and springs upon the land of plaintiff.

A No; that was, referring to a condition where the springs were in the same formationor same saturated plane as the well being pumped, and on the assumption that the law regulating the effect of the cone of depression is as I have stated to be, that the pressure on the water plane must be measured from the bottom, and that there is no local condition like a clay bed between the spring and the well in the same plane of saturation or other local conditions which would shut offpressure or effect of the water going toward the cone of depression through the water plane.

Q Mr. Goodcell asked you some questions on the assumption of a duct connecting the Cucamonga Springs with the Haskell well: State whether in your opinion there are any facts which justify such an assumption in this record?

A No; that assumption is merely hypothetical and is disproved by the frequent equal elevations of water in the Haskell well of which I gave 8 instances, when the heads were there either exactly the same or within a small amount of the same, and the great variations in the

flow of the Cucamonga Springs. If there was such a duct to the Haskell well which regulated the Cucamonga ~~wit~~ Springs, then whenever these heads were the same the Cucamonga Springs would be the same.

The Court: You used the term "regulate". I suppose you mean by that--

A I mean the discharge of the stream would be in contact with the head, and therefore the head would either increase or diminish the flow as it varied, and when the head is the same the discharge would be the same.

Mr. McKinley: Q. You were asked by Mr. Britt as to the depth of the water plane in a number of wells to the southwest: Will you make a comparison between one of those wells determining the water plane with one of the 16th Street wells as a central point and the Haskell well as showing the inclination of the water plane?

A If we first take the figures given of the plane of saturation on page 88 of the transcript, when in well no. 3 on April 11, 1904, the elevation of the well being ~~13.49~~ 1349 on that date--

Q That is, the ~~wat~~ surface of the water plane?

A Yes, sir; being 1349 feet on that date, and on the same date well no. 7 being 1347, or 2 feet fall from that point to the Haskell well in a distance of some 3600 or 3700 feet,-- and taking the same well no. 3 and comparing it with the water levels of the wells to the suth w st and reducing the water levels to 1900, by the ratio which well no. 3 has varied since 1900, we find that to experimental shaft no. 4 which is 2700 feet west and 600 feet south of well no. 3

there would be a fall of 39.1 feet in the water plane in a less distance than that to the Haskell well where there is a fall only of two feet.

Mr. Britt: Q What date was that?

A That is assignable to 1900.

Mr. McKinley: Q What is the nearest measurement you have got to that in well no. 4? What is the date of your elevation there,

A Well no. 3 and well no. 4-- experimental shaft no. 4-- were bored originally in '90 and from that I obtained the ratio; and assuming that shaft no. 4 has fallen the same as well no. 3. We might go back to '90 and get the same results.

Q Suppose you do that.

A If we do that and go back to '90 when well no. 3 was 1449 feet and experimental shaft no. 4 was 1410.5 feet, showing a fall of 39.5 feet in a distance which I have given of 2700 feet northwest and 600 feet south, showing many times the decline or fall of the water plane between those two points than there is between the Haskell well and well no. 3.

Then we might go to '99 and extend it to the Sourwine shaft. Taking the highest elevation of well no. 3 in '99 and the Sourwine shaft, we have a fall of-- I will give the elevation of the water plane in each: the elevation of the water plane in well no. 3, 1402.9, whereas the Sourwine well was 1176. feet, 226.9 feet fall in a distance of 1650 feet west and 3200 feet south from well no. 3. And that slope corresponds closely, if you take it in a southerly direction, to the slope between experimental shaft no. 4 and

well no. 3 as to their water planes in '90, demonstrating that thelight gradient shown to theeast is a mere lateral resultant of the movement of the water and not the greatest slope of the water plane or the direction in which the water plane travels, and corroborating in that regard the exhibit Z-9 and intervenors exhibit no. 2.

Q What is the distance in an air line between the Bourvine well and well no. 3?

A It is just the same as the distance between there and the Haskell well no. 7. Scaling it from exhibit D, it scales between 3600 and 3800 feet in an air line.

Q Taking intervenors exhibit no. 2 which you refer to in your cross examination, will you point out the direction of the water plane as shown by the contours there?

A From one of the 16th Street wells?

Q Yes.

A Taking well no. 3 and the hydrographic contours from that,-- They haven't shown it. I will have to take well no. 5. Well no. 3 is not shown. But starting from well no. 5 which is the easterly one of the 16th Street wells and drawing the green line from that well beginning with that contour 1346-- the hydrographic contour-- and at right angles to the next contour at 1333 and then to 1294 contour, the direction of that water would be on this green line which I will mark A-B at its two extremities. Then if we go to the Haskell well no. 1 and draw a red line also at right angles to the contours. the water plane will go in the direction which I am drawing this line between the limits C and D at the two ends. That is in accordance with the way the con-

tours are laid on the exhibit. Both of the directions would be in a southwesterly direction toward the outlet of the basin.

Q. Have you drawn a diagram illustrating the matters discussed by you and Mr. Britt and subsequently Mr. Goodcell, with regard to the cone of depression as illustrated by the diagram on the blackboard?

A. I have drawn a diagram on that subject.

Q. Please produce it and explain it.

A. (Pins diagram on board.) This sketch or diagram on the board illustrates first a well penetrating through the saturated basin or mass and not an artesian basin. The upper line which is fringed with marks drawn in black pencil is the surface of the ground where the well is drilled; the two parallel lines running down through the diagram vertically represents the bore of the well which is marked "well" at the upper end; the name of the diagram at the bottom is entitled "sketch of surface water or non-artesian well. red represents clay and silt lozenges; blue represents gravel and sand. Beginning at the surface we will assume first that the well is drilled down to the point marked with the dotted line across the well and lettered "suction limit" in black pencil. If thewell is pumped down to that level the cone of depression would form to a depth marked H close to the well bore, between the two arrow points pointing in each direction, that being the head on the cone of depression and the pressure on the water plane would be diminished that quantity. Now if you continue this well down to the next clay lozenge and stop at the next

dotted line in that lozenge before we penetrate through it, we have a vertical distance also called H between the upper point of the arrow and the lower point of the arrow in the clay lozenge. If that well is pumped it would still have the same quantity of water and would have the same cone of depression as before it was penetrated into that lozenge, because the water cannot go through the lozenge, and the additional depth of the well in that compact clay gives no benefit. If you go on six inches and get into the next pocket below, we have then connected up that body of water below that lozenge with the body above it, and our hydraulic head on the well has been increased to the full limit from the top to that point, and the productivity of the well has also been increased in proportion to the head and added area of the pipe, in spite of the clay lozenge. Then if we penetrate down still deeper, as shown by the third arrow point, in a vertical distance marked H', deeper into the next gravel bed, the productivity of our well would be still increased due to the head H' acting upon it. Now if we penetrate down to the fourth dotted line into the second lozenge, we would have no greater productivity or different head or greater room for producing water than when we had just reached near the top of this second clay lozenge, and the line drawn vertically between the fourth arrow points marked H' again would be just the same as the other H' at the top of the clay lozenge. The well would not be increased in its productivity and the water below the clay lozenge could not get in.

If we make the next extension down to the fifth dotted line

across and obtain the head between the fifth arrow points in the vertical distance marked H", we have then again connected up another body of water, and having additional length of bore our well is increased proportionally in productivity. And then if we extend down into the third clay lozenge we again repeat the same operation etc.

And this diagram illustrates how a well in a plane of saturation which is non-artesian becomes more and more productive as it reaches greater depth and that it may gain enormously in productivity by penetrating only a few inches through the clay lozenge into which it has been passing for a long distance. The productivity of this well would depend on two conditions, aside from the porosity of the gravel in the basin: One of them is to the head of the last open stratum of water from the surface of the water plane, which would vary as H, H' and H". The next is the diameter of the bore and the length of the bore.

Q. Suppose you assume clay below and anartesian flow: What would be the result if the head was lower than that of the upper stratum?

A. The result would be to extend this last red clay bank or lozenge across , with a less pressure below when you penetrate that,-- less hydreulic head below,-- and it will draw the water from the uper strata and you will have the bottom fall out of your well either wholly or partially.

Mr. McKinley: We offer this in evidence as defendants EXHIBIT Z-15.

Q What has been the general condition of the water plane in Southern California since 1900?

A The water plane fell from 1900 to 1904 and in many places to 1905 as, for instance, in the San Bernardino Valley, where some of the wells furthest away from the mountains and in certain zones showed a fall up to the fall of 1905. After that they began to recover. In other localities the fall has usually been at some distance from the mountains continuous from 1900 up to the latter part of 1905, and since 1905 has been raising, except in a few localities where the water plane has been overdrawn, such as the small basin in the Yucaipe and some other exceptions. But generally since 1905 the water planes have been recovering some every year, and the same is true of the Red Hill section, both with the artesian and the recent alluviums. Since 1905 the water has been rising from the greater rainfall; following that period the water has been rising.

Q On cross examination you were asked with reference to your testimony in the McPherson case and in regard to the following testimony on page 1096, line 11, and you testified that you gave the testimony:

"Q Now, Mr. Finkle, resuming where we were this morning-- I think we were upon the washes-- I will ask you, supposing that a surface wash would indicate in any way the course of any subterranean streams under them, where would the subterranean streams run with reference to Westbowell wells?

"A There would be one subterranean stream running to the east by the winery. That would be the largest in size."

Did you also testify, completing the answer which I have read, as follows:

"~~Thatxxxxxxxxxx~~

"Then there would be another subterranean stream running at the easterly of the bridge between the red hill and north Ontario, which is the second largest, and then a third running stream under the intermediate wash shown on defendants' map 12, and a small subterranean stream, smaller than any of the others, coming down and coming just to the west of the group of the Stovall wells. That is not indicated on this map, as it is a very small wash down at that point. It rather spreads out, but spreads out toward the westerly." Did you so testify?

A. I did. That completes my answer.

Q. Upon the trial of the Matherson case did you testify as follows, soon after the other testimony which was read, on page 1098, beginning with line 3:

"Q. I will ask you, however, if in your opinion the washes upon the surface of the earth are any indications of the course of subterranean streams several hundred feet below the surface at about the Red Hill or in that vicinity?

"A. The washes in the valleys outside of the mountain canyons are no indication of subterranean streams of water or flows of water. Within canyon walls in mountain ranges, very often the washes are a good indication as to subterranean water flowing in the canyon. I am speaking about valley conditions when I answer your question.

"Q. I will ask you what this map I show you is.

"A This is a compilation of the geological survey sheets from San Bernardino to San Fernando.

"Q Taking that map, I wish you would illustrate if you can what you said about the surface washes being no indication of an underground stream and as to the existence of water bearing lands.

"A Referring first to the articular locality under discussion, Cucamonga Canyon, the evidences are abundant at that place that the building up of the cone or deposit in the valley below that canyon has been made by a very great succession of changes in the surface wash. The surface wash has had a swing over about 170 degrees or thereabouts, from the mouth of the canyon down to the valley, and in successive periods has built up one side and then shifted to a lower ~~point~~place and then built up that one. The fact of the wash being where it is to-day is a mere accident in that matter of building up the valley below. It has undoubtedly flowed much further east and also much further west in times past. And the same may be said of every other canyon along this foot hill range where they enter the valley. The velocity of the water is decreased by the spreading as well as the falling off of the grade lines. This tends to the making of a deposit. The transporting abilities of the water being lessened it caused a deposit of a cone; and as these become higher the channel refuses to run on the ridge and takes a course one side or the other and the construction goes on for a time and shifts over again.

"Q Does it shift through the entire arc of 170 degrees?

"A I think that in the period it has, in the case of Cucamonga Canyon, shifted throughout that entire arc."

"A. Does the composition of the yachting world differ from the fraternity in the Terrace.

By taking a map, I wish you would illustrate if you can what you mean by active racing, in distinction of motorboating, shown and so in the existence of water just land.

"A. Referring first to the estimate hardly solar (ex-cuality, Lincoln Cayne, the evidence are changed, it was plain that in building up of an, some or equal in the only have experienced my lack that it is very great matter of danger in the racing yacht. The Burgess said had had a sailing area about 175 figures or thereabouts.

Then the mast of the cayne down in the sailing, and it necessarily prints the hull up and also and have sailing in a tiny pennants and then built up that one. The fact of the mast hung only at it seems is a very serious to that matter of building up the sailing hull. At the moment the Cayne was first and also some Cayne was to have practice in a one-day in all of very a-to-cayne also. This was will range more than a-to-cayne. The effects of the cayne is increased or decreased in that of the Burgess at Marblehead. This leads to the sailing of a yacht. The transporting abilities of the cayne being lessened it caused a length of a year and so have been before the second cayne is the to a-to-day and have a mast and also is the water and the sailing yacht to the a-to-cayne sailing.

"Q. Does it seem reason the sailing and of the Herreshoff "A. It does not in my opinion is here, in the year of cay-

Did you so testify?

Mr. Britt: Plaintiffs object to the question as irrelevant immaterial and hearsay and incompetent for any purpose, and not necessary to explain any testimony or answer given by the witness in the trial of the McPherson case concerning which he was interrogated by plaintiffs. It relates to the phenomena of underground streams, with which we are not concerned in the present case with sufficient directness to justify the introduction of testimony on that subject given at a former trial and not in the present case.

The Court: What is the purpose of the offer?

Mr. McKinley: It is to explain the testimony which was offered here showing that in 1900 Mr. Finkle testified that the principal wash was the one east of the Red Hill. It is offered for the purpose of showing the evolution of the washes and explaining the fact that the testimony at that time was not inconsistent with this , because he was testifying to practically momentary or temporary conditions of the washes then. As far as its having any effect in this case other than being explanatory, I don't claim that it has..

The Court: The one previously offered, I could understand.

Mr. McKinley: This is explanatory of that also, showing his testimony as to the character of the wash, that its being the principal stream did not mean anything except that it was the principal stream at that time.

The Court: I am not sure whether that is the effect of it or not. Mr. Britt's suggestion is that it was on the theory of a stream in that case, while here there is no stream theory, and the only question is was it explanatory of

what was offered by Judge Pritt.

Mr. McKinley: That is the only purpose for which it is offered. That is the only effect it can have

The Court: What was there offered by Judge Pritt of which that is explanatory?

Mr. McKinley: The testimony of the witness that the wash on the east side was the principal wash which was offered for the purpose of contradicting his testimony given here at this trial that that was not the principal wash. If that was inconsistent with the testimony given here it is proper to explain that his testimony did not cover a long period of time but only just the time when it was given.

The Court: I think I will sustain the objection on general principles.

Mr. McKinley. Exception.

Q. I would like to ask the witness if he testified as follows in the trial of the McPherson case:

"Q. Referring first to the particular locality under discussion, Cucamonga Canyon, the evidences are abundant at that place that the building up of the cone or cone it in the valley below that canyon has been made by a very great succession of changes in the surface wash. The surface wash has had a swing over about 170 degrees or thereabouts, from the mouth of the canyon down to the valley, and in successive periods has built up one side and then shifted to an lower place and then built up that one. The fact of the wash being where it is to-day is a mere accident in that matter of building up the valley below. It has undoubtedly flowed much further east and also much further west in times past.

And the same may be said of every other canyon along this foot hill range where they enter the valley. The velocity of the water is decreased by the spreading as well as the falling off of the grade lines. This tends to the making of a deposit. The transporting abilities of the water being lessened a deposit of a cone; and as these become higher the channel refuses to run on the ridge and takes a course one side or the other and the construction goes on for a time and shifts over again.

"Q Does it shift through the entire arc of 170 degrees?

"A I think that in the period it has, in the case of Cucamonga Canyon, shifted throughout that entire arc."

Did you so testify?

A I think it is possible that the degrees may have been 117 instead of 170.

The Court: The question is did you so testify.

A Unless there is an error in the transcript in the figure 170, I did so testify. There may be some doubt whether I said 170 degrees or 117. I didn't read this transcript over after it was made like I have been doing the present one in this case. But the rest of it I am sure I testified to.

Q Did you testify as follows in that case on page 1114, line 8:

"The evidence tends to show that the water is resisted and impeded by the formation and in that way the escape movement would be deflected by the Red Hill and the little Red Hill in a southwesterly direction to the more porous deposits southwest."

Mr. Britt: Objected to as calling for testimony that is irrelevant, immaterial and hearsay and not connected with any testimony of the witness proved by plaintiffs to have been given by him in the trial of the McPherson case, and not necessary to explain any such evidence proved here.

The Court: I think I will sustain that objection. I don't think it is necessary to explain the other testimony. Defendants except.

Q Mr. Finkle, will you explain the statement made that was shown to have been made by you in the McPherson case that the Red Hill was a capping or surface conditionn as indicated by the borings?

A That was based on the evidence which exists, and that the Red Hill does not appear on the surface at all points, and that it was a local surface capping of the older formation under it, and that it does not extend to the west where the recent alluviums are laid down in the outlet of the gravel reservoir; and the wor s "local surface" xxx as used by me there, and shown by the context or whatever else I may have said at that time--

Mr. Britt: I move to strike out what the witness says is shown by the context.

The Court: Stricken out.

A The expression "local surface capping" used by me then was in the sense that it didn't cover the entire surface, for xx the recent alluvium covered all of the surface except where the Red Hill was in evidence, and that it was a capping of the older formation below it and not a capping on therecent alluvium. That was not my meaning and I didn't so

inted it, as my answer also, as read by Judge Britt, refers to something that I had already stated. My answer begins "I think I have already stated". It goes back to something I had previously said.

Q Did you testify as follows, referring to the Red Hill, on the trial of the McPherson case; line 17, page 1100: "A That forms deposits of a similar nature to many of those, although I am rather inclined to think there are evidences of an earlier geological period in some of those wells,-- the period in which clay was deposited more extensively and afterwards lifted up by some agency."

Mr. Britt: Objected to. It is not connected with any matter testified to by him as being a portion of his testimony in the McPherson case, or necessary to explain it.

The Court: The objection is sustained. Defendants except.

Q Mr. Finkle, you made some measurements at the Red Hill on the 7th of April.

A I did.

Q Springs, tunnels, elevations of wells?

A I did.

Q Give all of them.

The Court: What date?

A The 7th of April, 1909. I went out with Mr. Irsak after court adjourned, leaving here at 5:25 on the Santa Fe train, and we were met by an automobile at Upland and went out and made the following measurements: Amount of water at Cucamonga Springs flowing to waste down the channel below the intake to the 30-inch pipe line leading to the Creek Division Box, 41 inches under a fourinch pressure. Amount of water taken

into the 30-inch pipe line, 10.84 inches measured over the Creek Division box, of which 10.34 inches were going to the Old Settlers side and one-half inch going to the other side of the box.

Q. Is that 10 part of the 41?

A. No; that is additional. Taking these together, we would have 51.84 inches as a total flow of the Cucamonga Springs without the Y Tunnel. Then I also measured the Y Tunnel over the weir in the Y Tunnel Division box, and found 31 inches, which added to the 51.84 at Cucamonga Springs, would make 82.84 inches as the total flow of the East Side Cucamonga Springs and Y Tunnel, of this, 41 inches being undiverted and running down the natural channel. Also, on the same date, I measured the reservoir on the property of plaintiffs below the Creek Division box, and found that it was approximately 188 feet long in one direction, 218 feet in the other, and being about rectangular, and that it be possible to store in it a depth of 6.2 feet of water, which would give a capacity of 254101 cubic feet of water. Then I measured the elevation of water in well no. 7--

Q. Before you finish with the reservoir, what amount of water would that provide at 100 inches a day?

A. If you should fill that reservoir you could run approximately 145 inches for 24 hours out of it, or you could run one third of that for three days. It is practically 50 inches for three days.

Q. Did it have any water in it?

A. No; it was empty above the outlet.

Q What do you mean by that?

A That is, the only water in it was water standing in pools that couldn't run out through the drain pipe. There was water in pools in the bottom, but it was not water from which water could be drawn.

Q While we are on that, what was becoming of the 41 inches of water?

A That was running down the storm channel or wash from Cucamonga Springs and wasting below the Red Hill in the gravel.

Q Proceed with the other measurements.

A Well no. 7, I measured the depth to water, and found the water plane to have an elevation of 1[illegible].1 feet above sea level. Well No. 3, I measured the depth to water and found the elevation of the waterplane 1363.5 feet above sea level. Well no. 9 at the Lady Tunnel, I measured the depth to water and found the elevation of the water plane to be 1353.5 feet above sea level, this being regulated by the bulkhead in the Lady Tunnel the same as well no. 14 of the plaintiffs. Those were all the measurements we made that day.

Q What if any additional conclusions did you draw from those measurements?

A I think I have given those conclusions, that the recovery of the Cucamonga Springs is rapid, being 10.34 inches since the 15th of March last, in a space of time of three weeks, and that the water plane in the 16th Street wells and in Haskell well no. 7 is recovering, but more slowly than the recovery of the Cucamonga Springs.

Mr. Haskell: Do you mean Cucamonga Springs and Y Tunnel?

A I mean all I have testified to. I classify those as one development, since the Y Tunnel only diverts part of the Cucamonga Spring.

Q But if you confine that statement to the Springs it is not including the Y tunnel, and it would be an increase only of a little over an inch.

A Yes; because the Y Tunnel is higher up and taps the water before it reaches the springs, and it is certainly part of it, and I don't think it has been denied by any one that it is.

Mr. McKinley: Q Did you observe the Y Tunnel, whether it is bulkheaded or not?

A Yes.

Q Is it bulkheaded?

A No, sir, the Y Tunnel is not bulkheaded.

Q What would be the effect of bulkheading it?

A If the Y Tunnel were bulkheaded the most of the water which is now running from it and ~~of~~ which ~~the~~ greater quantity of water is wasted from the Cucamonga Springs, could be stored and saved for irrigation.

The Court: Is it practical to bulkhead it?

A Entirely practicable, the same as the Lady Tunnel and the Lone Star.

Q Is this a solid rock formation?

A No; it is in the ancient alluvium. By bulkheading in the ancient alluvium you can save most of the water. You can't save all because some will percolate around the bulkhead. But you can save the greater part.

Mr. McKinley: Q. You were asked on cross examination with regard to possible fissures in the old formation: What is your opinion in regard to that?

A. The only fissures in the old formation would be in the crest or down slope of the Red Hill, as the bending of that point would have some tendency to open fissures; in the bottom of the bowl the bending would compress, as the formation is very thick-- the ancient alluvium itself-- and the bending of the formation would create a condition on the inside of the curve which would depress the bottom of the bowl and make it more compact and solid than it was in the original state when it was laid down. That is illustrated by any substance which can be bent, like steel, or even ~~xxxxxx~~ a rubber eraser. Bending that in the manner in which I am bending the rubber eraser, it makes the inside more compact and the outside of the curve more open.

Re-Cross Examination.

Mr. Britt: Where would that bending occur in the old formation by means of which the formation or some portion of it is made much more dense?

A. That occurs in the bottom of the bowl, as it has been called, or the synclinal of the deposit.

The Court: It is the upper surface of the low formation.

A. At the upper surface of the low formation, at a place where the new formation overlies it.

Mr. Britt: And the anticline is where?

A. That is in the reverse direction.

Q. I want to know the locality where it occurs.

A. At the summit of the Red Hill-- the apex of it.

Mr. MARLATT: The very idea of an Irish constitution also begins to galvanize citizens in the air formation; that it may exhibit in reality is that.

The only thought in his old fortunes would be in the most an-fume days of the bad till, as the leading at that point would take some tendency to give prominence the action of the fort. The leading would imperfect, if the condition is very bad— the British citizens idealize— and the leading of the formation would create a condition on the lines of the nerve which would express the action of the lost and make it more compact and still keep it one in the original which when it was like dress. Then it illustrated by any definition which can be had, like what we can make a right image. Having that in the mount in which I am leading the rebel armed, it make the lo- cal nerve complete and the mention of the nerve very open.

Chairman [illegible]

Mr. LYNN: Then would the leading mount in the air form- tions by means of which the formation of some period of it is well that mere mount.

Then mount in the nerve of the week, so it has the nerve, or the opposition of the regard.

Chairman: It is the nerve number of the in formation.

The formation number of the one formation is a plan that the Irish leading mention it.

Mr. MARLATT: The condition is every.

Then is in the nerve formation.

I want to have the leading mount formation.

I had the mount of the nerve— the nerve it is.

Q About where?

A I have indicated on one of the exhibits approximately as near as you can determine from surface indications. I believe that is exhibit Z-10, but I want to look at it to be positive.

Mr. McKinley: Z-10 is a hydrographic map.

A Then it must be Z-9.

Mr. Britt: Where is the syncline?

A The synclinal is north of that in the bottom of the gravel reservoir lying north of the Red Hill.

Q About where do you locate that syncline?

A The lowest point of it not being exposed to view, cannot be located with as much definiteness as the anticlinal. It is between the two points of bending and probably about half way.

Q Is there any of what you call that older formation exposed after you leave the Red Hill and travel north to the Cucamonga Canyon?

A No, sir; that is covered by the recent alluvium.

Q Clear up in the canyon?

A Clear up in the canyon; the only place you find any of the old formation exposed, is in the higher elevations of the mountain, where the Champlain is discernible, in some places, uplifted.

Q How high?

A Varying points; take the mouth of San Antonio Canyon, it runs up there for nearly a thousand feet above the level, and at Lytle Creek, it runs over up, over 2000 feet, at the Texas Point mine.

Q Slanting distance up the canyon or perpendicular elevation.

A It is not perpendicular; it has the slope of the mountain; at that point, the Texas Point mine in Lytle Creek, it has a regular slope, corresponding to the shore line wherein it was deposited.

Q When you say 2000 feet you don't mean perpendicular elevation, but you mean parallel to the bottom of the canyon or something near parallel?

A I don't just mean that. I mean in the Champlain period when there was still water at the base of the mountains, the erosions were dumped into the still water and arrested in their movement near the shore, and that those deposits were made in that way.

Q I didn't ask you about that; can't I get a simple answer

to a simple question, without your branching off into a long discourse about something which I did not ask you about. You say there are some at the mouth of Lytle Creek,- that there is some of the old deposit, which is about two thousand feet up into the mountain? Is that what you said?

A Which deposit do you mean?

Q You are the man defining the deposit; I understood you to say that the old deposit at the mouth of Lytle Creek extended for 2000 feet, and I inquired of you whether you meant perpendicularly for 2000 feet thick, or whether you meant it runs along the slope of the mountain, for a distance on the slope of 2000 feet?

A In replying to that I said the Champlain deposit is what I referred to ; that is the old deposit,- older than the recent gravels.

Q You were proceeding to reiterate how the Champlain deposit was laid down; I am asking you now that trace of the old alluvium up there, at the mouth of Lytle Creek that you referred to.

A Whatever traces there are have the slope conforming to the slope of the mountains.

Q And I ask you now, is that 2000 feet in perpendicular thickness, or 2000 feet up the slope?

A If you refer to the deposits at Lytle Creek, we have evidences of both, and I say that from the exposures they are more than 2000 feet in thickness, as well as in length along the slope; that would be my judgment.

Q Is there any exposure there of 2000 feet in perpendicular elevation?

A Along the slant of the mountain there is; I have not measured it, but I would estimate it at that.

Q Do you mean that the canyon is cut into that formation at right angles to it, so that there are bluffs or cliffs or ridges, on either side of the canyon which will measure 2000 feet in perpendicular thickness?

Mr Schinley: Is this Lytle Creek you are inquiring about now?

Mr Britt: Yes, sir.

Mr Schinley: Then we object to it as not proper cross examination.

Mr Britt: I think the witness took us up there.

The Court: I think the witness said something in his direct examination about Lytle Creek.

Mr Schinley: Well, if that is so all right; I withdraw the objection.

A I mean that the canyon has cut through it when the re-elevation took place; while it is not perpendicular it lies and slopes in such a way that from the lowest point to the highest point it will probably be about 2000 feet in thickness.

Q You mean that the extension is parallel with the axis of the canyon about 2000 feet?

A I mean that it is like a cut, and the sides are sloping and this formation is exposed for that height on a sloping angle.

Q Well, that takes us somewhat away from the question I had a mind to put to you relative to this synclinal fold made in the manner that you speak of, between the Red Hills, along

where the 16th street wells are situated, or a little south of them, and the mountains to the north, wouldn't that compress the water in these celebrated ducts and veins that you speak of and break them up?

A The mere bending might cause some obstruction to flow through the ducts, but those gravels, if they were porous gravel veins, while the ones near the surface would be somewhat consolidated, there would be no opportunity to consolidate those gravels so they would not carry water under pressure.

Q If you bend a duct or vein, which is carrying water under pressure, subject it to the sort of process which you speak of, wouldn't it press the sides together, derange the previous arrangement?

A It would do that in a lateral extension of the vein, but if there is no faulting movement in that action, the only result would be to make the walls more solid than they were before, and the veins would be better enclosed than they were before.

Q If it would affect them as you state in a lateral direction, which is not the direction of the bend, wouldn't it also do so in a perpendicular direction, which is the direction of the bend, according to your hypothesis?

A I think not; if you take anything and bend it in a curve, you compress the inside of the curve, and make it more tight; and you open the outside or make it more porous, but you don't change the arrangement of the material and make offsets in the veins; the water would still pass through as it did before.

above the full-sized wallscroll attached, in a visible space of room, and the controls to the panel, which I also gave the main in order adjustment knobs and value dial, the space of one hand-span.

The more finally still minor non-distortion is flow through the motor, but that cannot, if they were placed every twelve, while the rotor-rotor the motors would be additional assemblies, there would be no experimental considerable those pieces so long would not carry water more pressure.

If you had a fan or pump, which is moving water about wherever, perhaps it is the work of gravity with you and, wouldn't it prove the whole engine, despite the previous arrangement?

It would be that in a tapped reservoir or the main, but if there is no facility provided in this design, the water would be to take the water back that they were before, and the water would be rather wrinkled than very more below.

If it would affect your so you write it a tiny pipeline, this is not the direction of the jet, wouldn't it also be of a perpendicular direction, that is the direction of the wall, according to your hypothesis?

I think not; if you take anything and hold it in a curve, you compress the inside of the curve, and make it more light, and you keep the outside as into it more curve, but you don't change the arrangement of the material and that affect in the -tiny the water would still pass through as it did before.

Q When you come to your anticline you said that broke open, and so gave vent to the springs.

A I did say, yes, that the clay covering, by reason of bending it apart would crack on the outside, the same as if you take a strip of clay, and bend it, it will crack on the outside.

Q Why won't your syncline break on the under side?

A It will crack open on the under side.

Q And the water will run out into the channels below will it?

A It is on bedrock; I don't see where the channel below could go to.

Q If the water escapes, no matter whether it runs out through the bedrock or not, the water would be diffused through the wholeformation in that event?

A I don't think so, because it would not have any exit; there might be cracks which would fill ~~water~~ water in the lower part, but they couldn't - the water could not flow anywhere, because the whole of this formation is laid down on bedrock.

The Court, Q You speak of these ducts not being influenced by the fold,- I suppose that is on the theory they are in the direction of the fold,- if they were transverse they would be affected would they not?

A If they were transverse the bottoms of the ducts might be opened; the tops could not be opened, because the top would still be in the upper part which is all consolidated by this fold.

Q Wouldn't the tendency be to ~~fix~~ fill up the ducts if they

were transverse?

A I think not; I think the only result would be that the covering over the ducts would be consolidated, and the bottom of them would be made more porous, by the bending along the line of the ducts; without offsetting the formation by a faulting those ducts could not be filled up.

Mr Britt, Q When you come to your anticline, and your ducts break under the influence of the bending, and so give vent to the springs, isn't it just as reasonable to supposethat whenyou come to your syncline, that your ducts break open, and that the water escapes from them and flows down to the bed-rock?

A Well, it might fill the spaces down to the bedrock, but where would the water flow ~~at~~ to? I don't see any place for the waterto flow to, at that depth.

Q Your ducts, however, as I understand your testimony, traverse and ramify through the whole formation, don't they?

A That is correct.

Q Well, then wouldn't the breaking up of the ducts, if they will burst open on your arti-cline, and so give rise to the Springs, such as we have at the Red Hill, wouldn't they also burst open in your syncline, and have diffuse themselves throughout the formation as percolating water?

A I don't think they would, because the bursting open which you refer to is not a vide fissure; it is simply a stretching of the formation so that it has more pore space, and that pore space, if it leads up, and the water be under pressure, would discharge water to the surface, or tend to lead water to the surface, and form springs; if it be down towards bed-

rock, that pore space would immediately fill with water, and that would be equally impervious for the ducts to rest on, being under the synclinal, as the bedrock itself.

Q But your water would diffuse itself throughout the formation, if your ducts were broken open, wouldn't it, and the sides are pressed together?

A I don't see how that could make water run through clay; it would open pores in the clay, and they would fill with water.

Q Do you think those ducts are in the nature of lead pipes, such as they will bend without breaking, until they come to the summit of the anticline, where Springs appear in the Red Hills, and thereupon there is suddenly a bursting open of the previously highly tensile and ductile metal -

A No, indeed.

Q And the water is then diffused through the material into the soil of a clay character, in the manner that you have described, as accountin for the appearance of these Cucamonga Springs?

A I think those ducts are enclosed in clay and silts, which will bend at all points, and in bending will become more porous on the outside than on the inside of the curve; and therefore on the synclinal next to the bedrock there would be more pore space created by the bending than there was before; and the same way on the summit of the Red Hills there would also be more pore space than there was formerly, but water will only escape through those on the anticlinal, because there is no outlet for water on the

pack, then open space would immediately fill with water, and that would be equally impervious for the force to press out, being under the spiritual, as the material itself.

Q. But some water would diffuse itself throughout the formation, if pint ducts were broken open, would it, and the alone be present together?

A. I doubt not but that would make water pass somewhat slower; it would cause power to be off, but they would fill with water.

Q. Do you think these ducts are in the volume of land plane, such as they will land without breaking, could they come to the summit of the mountains, where the large square is the top of the hill, and therefore there is necessarily a breaking open of the perpendicularly highly tensile and ductile metal - a lie, indeed.

Q. And the water is then diffused through the material into the wall of a clay chamber, in the manner that you have described, as accounting for the appearance of these

Thermogen Spring?

A. I think these ducts are contained in clay and silica, which will bend at all points, and in bending will take more pieces on the outside closing the inside of the course; and therefore as the spiritual water do the material there would be more power exerted by the bending than there was before; and the water may be the summit of the land little times would also be more open upon than there was formerly, but water will only wedge through there as the wedding, however there is no doubt for water to be.

synclinal; it is under pressure, resting on a rock formation where the original detritus is laid down.

Q How do you think that uplifting of this red alluvium along the foot hills of the mountains corresponded in point of time with the fold of the same material, which you say is apparent now in the Red Hill?

A I think they corresponded in time; the movements were all contemporaneous.

Q And its effect was, as the Red hill was projected up in the plain, the foothills or mountains also were projected upwards, carrying the older alluvium with them?

A Precisely; bending it with them as they rose, and fractured it near the base, where the contact was with the old rocks.

Q About where do you think is the axis of that Red Hill fold? Somewhere I believe you stated roughly parallel with mountain range.

A It seems to be roughly so; and the surface evidences seem to bear slightly more to the northeast and southwest, than the mountain range itself.

Q You think the summit of bedrock, I believe you have called it Plutonic rock, the sharp edge of the upheaved rock which produces the surface elevation called here the Red Hill, corresponds roughly to what we see of the same Red Hills on the surface of the earth today, do you?

A In a rough manner I think the anticlinal corresponds to the projections which we see today, and the projections we see further west at Indian Hill, and as far as Pasadena, the same formation being in evidence.

typical; it is under pressure, resting on a rock formation
where the original surface is laid down.

Q. Can do you think that splitting of this red sliding along
the fault belts of the mountains corresponds in point of time
with the rise of the main material, which you say is apparent
now in the red hill?

A. I think they corresponded in time; the movements were all
contemporaneous.

Q. And its effect was, as the red hill was projected up in
the plain, the foothills or mountains also were pro-
jected upwards, carrying the older alluvium with them?

A. Certainly; bending it with them as they rose, and then-
turned it over the base, where the material was worn away like wi-
ashes.

Q. Therefore in you view is the main of that red hill
right? Somewhere I believe you stated roughly parallel with
mountain range.

A. It seems to be roughly so; and the surface minerals seem
to have slightly moved in the sediment and movement, from
the mountain range itself.

Q. You think the result of pressure, I believe you have
stated in plastic rock, the sharp edge of the upturned rock
might produce the surface alluvium rolled over the red hill,
correspondingly to what we see at the same red hill as
the surface of the sea is today, is that?

A. In a rough manner I think the original corresponds
to the projections which we see today, and the projections
we see further west at Indian Hill, and be the Pendleton,
the same formation being in evidence.

Q Now, when those strata feeding the older alluvium which lie along the foothills were upraised you informed us that they presented a surface which is indicated by your line GH, made at the request of Mr Haskell, on the map Exhibit P, from half a mile to a mile in width?

A That is a hypothetical line which I drew in replying to Mr Haskell's request to fix some limit.

Q Well, you stated that a half a mile would be the inferior limit, and a mile the superior limit of the width of the upturned strata?

A Of the upturned and eroded strata,- that is my opinion.

Q You have also stated your opinion that the water coming down from the canyon is received into the crevices of those upturned strata, and that that has the first call, the first pull on the water out of the canyon, the old alluvium, as you call it?

A Yes, modified by the resistance in the more recent alluvium, which may divide the water before it reaches that depth.

Q And the water which enters the old alluvium, as you have previously explained, is permanently and irrevocably separated from the water which enters the new alluvium?

A After it has entered the dividing line between the two formations.

Q Now, the water is received, you say into the upturned strata of the old alluvium: how did it ever get across that half a mile or a mile, in order to deposit below the line GH or the line represented by GH, the new alluvium?

A Do you mean the surface waters - how did they ever pass

across it?

Q Yes, there were traps and pitfalls laid for it, by the upturned strata of the older alluvium.

A Yes; I suppose that whatever was needed at the time when the deposit began, would percolate into the veins and would fill them, and the discharge at the lower end, would require the amount that could be taken through that, and therebeing more of a supply than could be taken through the veins of the older alluvium, that the deposit began by the stream crossing over, and into the basin below.

Q That is, the stream crossed over, and carried with it what you have styled the new alluvium, from the mountain range above?

A Yes, sir; carrying that, and depositing that over the ancient.

Q Do you undertake to say that that stream, crossing over the upturned strata of the older alluvium for half a mile or a mile, simply ran across there, without any erosion?

A No, I don't think so; I think there must have been some erosion in the stream channels.

Q Don't you think there must have been a great deal of erosion in the stream channels?

A That would depend on the rapidity with which the range was uplifted; as we understand it, the move was a gradual one, and it permitted the building up, without much erosion.

Q Whether it was a gradual or a sudden one, as the stream ran across this older alluvium, it carried with it, necessarily, didn't it, a great quantity of the old alluvium?

A The streams came from the mountains pretty heavily charged

across it?

Q. Yes, there were tubes and artificial jaws for it, by the spherical plants of the older alchemy.

A. Yes; I suppose that whatever was needed at the time when the deposit began, would precipitate into the veins and would fill them, and the discharge at the lower end, would require the means that could be taken through that, and therefore some of a supply than would be taken during formation of the older alluvium, that the deposit began by the stream crossing over, and into the bank below.

Q. Then is, the stream crossed over, and carried with it when you have stated the one alluvium, from the mountain range above?

A. Yes, this carrying that, and forces that over the mountains.

Q. So you mentioned in my that that stream, crossing over the spherical shrubs of the older alluvium for half a mile or a mile, simply the matter there, without any crossing?

A. No, I don't think so; I think there must have been some erosion in the strata formerly.

Q. Don't you think there must have been a great deal of erosion in the stream channel?

A. That would depend on the regularity with which the range was uplifted; as we understand it, the move was a gradual rise, and it precipitated the deposition by natural rock erosion.

Q. Whether it was a gradual or a sudden rise, at the stream run across this older alluvium, it carried with it, necessarily, didn't it, a great quantity of the old alluvium?

A. The stream cross from the mountain pretty a mile changed

with detritus, and when they pass into the valleys, the velocity is always slackened, and the tendency is to deposit more than to scour out; that is the general tendency today, and it always has been that; as the velocity is higher in the mountains than in the valley.

Q You don't think the stream ran across there, running across the older alluvium with the strata upturned, gulping the water down, but that the older alluvium escaped any erosion?

A I don't want to say that it escaped any erosion; but I do say that a stream carrying debris is not a very good erosive agent, particularly if you check its velocity; it then becomes a better depositing agent than an erosive agent; although this was close to the foothills I would say the streams were more depositing than erosive.

Q Haven't you testified that in former times, the rainfalls were very much greater, in former geological times, than they are at present?

A I believe I have so testified; I believe that is true.

Q Weren't they therefore of much more erosive power?

A Yes, and for the same reason they would come more heavily charged from the steep slopes of the mountains, when they emerged in the valley.

Q You observe at the present time, with such streams as we have at present, that they constantly transport materials do you not from the mountains down to the valley, to the lower elevations, and sometimes transport prettycoarse material, gravel and boulders?

A Yes, sir; the coarseness depending on the nearness to the

with-abilities, and when they pass into the military, the
velocity of their elastomer, and the tendency is to modify
more than to wear out; that is the general tendency today,
and it always has been that; as the velocity is higher in
the mechanics than in the military.

Q: You don't think the above two series there, running
across the other activities with the metric quantum, getting
the mechanics, but that the other activities remained by
creation?

A: I don't think it may that it escaped any creation; but I
do say that a stress matrix device is not a very good
creative agent, particularly if you have the velocity; it
was Lamarck's better depositing agent than as creative agent;
although this was close to the Teleology I would say the
stress was more depositing than creative.

Q: Where's you testified that in Farmer times, the tribe-
lets were very much greater, in Farmer geological time,
than they are at present?

A: I believe I have so testified; I believe that is true.

Q: There's less therefore of such mere creative power?

A: Yes, and for the same reason they will also be serially
changed from the stony slopes of the mechanics, when they
emerged in the military.

Q: You observe at the present time, the tribe drawn to
some of present, that very friendly terminal activities to
the not fixed the terminal here to the military, to the terr
elevations, and sometimes transport particularly activities,
arrival and military?

A: Yes, dir; the centralize tendency to the centrum in the

mountains so that the coarse materials are left near the mountains and the finer in the valley below.

Q And as I understood your testimony, you testified that the streams acted in their channels, just as they act now?

A Very much the same, only on a more aggravated scale.

Q A more gigantic scale; a greater scale. And as the stream came down from the mountains, and descended upon this older alluvium, those upturned strata presenting materials which you do not claim were so solid that they could not be washed away, do you?

A No, I do not; I think there was washing of these materials but not to any great depth or any great extent.

Q Have you not noticed on the Red Hill as it appears now, how it has undergone considerable degradation, and didn't you tell us not long ago, that probably it is degrading now at the rate of some four to six inches in a century?

A The Red Hill?

Q Yes?

A I don't remember giving any estimate on the extent of degradation.

Q I thought you did.

A I think you are mixing up the Tucaipa case with this; we did discuss there the question of the degration degradation of some of the terranes.

Q No, it was in this case, it was either you or Mr Trask that tell us, that the Red Hill was degraded, at the rate of about four to six inches a century.

A It may have been Mr Trask; I don't remember giving any estimate as to that. To your general proposition of degra-

dation I say yes, as to the Red Hill, because the rainfall falling on there, accumulates in gullies and cuts away the red formation, and carries it down on to the plain.

Q You even told us it has been washed uphill there, so that it has made a deposit of the red material at the Haskell well, and I believe at the Rubio well.

A I didn't say it was washed uphill; I simply said when that was a basin, that would be down hill in that direction, and it would wash down hill at that time; the filling up has made it uphill.

Q But you did say that the Red Hill was formerly a good deal higher than it is now and been washed down?

A I did; I think it has eroded very much indeed; the evidences there are that that is the case.

Q That is the result of the rain falling on the Red Hill?

A Yes, sir; it will pick up the material slowly and deposit it in gulches, and it will be gradually carried down; there are half a dozen gulches now leading to the south, which have no connection with thewash above.

Q Then that red material does wash with facility, when it is subjected to the action of water?

A Whenever you permit water to run over it, which is not charged with all the silts it will carry, it will erode.

Q Well, don't you suppose that the water which ran over your half a mile or a mile of upturned strata of this older formation, must have been washed away also, and that a canyon was formed, or channel, or channels rather, through it, something like thechannel which we see at the present day at the mouth of the Cucamonga Canyon?

Gallon I may pay, or to take the bill, because the practical
lighting or there, commencing in Quality and just away the
real Irrealism, and morning it sense as to the state.

The Afro Gold in it has been mended Quality Money, so that
it has made a dynamic of the real industrial at the Lastly
will, and I believe in the Daily well.

I didn't say it was written Quality; I simply said some
that man a state, that could or then all in that discussion,
and it is a week down bill at lack time, the Utility we have
made it equal.

Not yet all may look the bill was directly a good
deal alone than it is one and have another day.

I did; I think it has written very well indeed; the
optimum story are that lost in the same.

What is the result of the rule Utility or the Two Lists

Now, sir, it will also up the commercial clearly and de-
mand of Q Prices, and it will be practically moving down
Every the half a term gallons for Leading to the small,
which have an commercial with through above.

I then that real industrial have week with Facility, then it
is replaced in the unions of water.

Consider you general entry is per year is, which is not
charged with all the alike it will carry, it will write.

Still, don't you suppose that in walk which the star
year half a bill is a side of industrial should of this also
Fortuitous, such have been reached away also, and that a cargo
was formed, or element, or economic ratios, through it, some-
times like unknowingly which or was it the without day or the
period of the Dominion Company.

A I wouldn't think that it would be possible to form a channel as deep as that, because that channel has grown from the gradual degradation of the mountains on each side, where there was not sufficient water to carry away the detritus.

Q You say that channel has grown - I should suppose that a channel was rather the result of a destructive process.

A You seem to misunderstand me, Judge Britt; I mean that the mesas which bound the mouth of Cucamonga Canyon, and which are high above the wash, are the result of local degradation adjacent from the foothills, and that as the channel did not flow there, there was nothing to carry the leachings from the hills down, and they gradually accumulated, and the rocks rolled down, and large boulders mingled with them, until they built up those bluffs on the sides of the canyon.

Q Well, that process of the cutting - why wouldn't the process of cutting down through the older alluvium when as you say the stream from the canyon was pouring down upon it, down from the mountains, why wouldn't the same process obtain which at the present day has eroded quite a deep channel there, at the mouth of the Cucamonga Canyon, - some places I would say the banks are 100 feet deep or more than that?

A You do not assume that has been all eroded do you?

Q Well, it looks to me as though something has cut it out.

A A portion of that has been eroded, and a portion of it has been made or built up by accretions from the hills, where there is no watershed to carry away the decomposed material.

probably you might assume that half eroded, and the other half was built up in the way that I spoke of; that might be an approximate estimate.

Q Well, I don't know; it looks to me like it was all cut out by the action of water.

But at any rate the water comes out that channel as we see it today, at the mouth of the Cucamonga Canyon, in a chasm 100 feet deep or so, through the detrital material at the bottom of the canyon: Why wouldn't a similar channel have been cut when the same stream flowed out upon the red alluvium, probably with vastly accelerated volume, and vastly accelerated velocity?

A I am not denying that there was erosion in the upturned strata; in fact I stated in my examination in chief, and in reply to Mr Haskell's questions, that there were erosions, and even if they were 100 feet deep, it would not have anything to do with the proposition I have advanced, as the present high bank peters out about a mile below the canyon proper, and it would also peter out, in the other instance, on your own hypothesis.

Q And the materials eroded would be carried out into the valley and mingled with the other material which would be transported by the running stream, and deposited at some point down below, and there wouldn't be any line of demarcation between the deposits made, between the two materials in the deposits so transported by the stream?

A Not at the upper end, but lower down, where the erosion would cease, below your mile limit, there would be that line of demarcation.

probably you might assume that half-half crystal, and the study-half was built up in the way that I spoke of; that might be an approximate estimate.

Q. Well, I don't know; it looks to me like it was all out of the action of water.

A. In my view the water cause and that accounted to me the is clear, as the basin of the Chesapeake Bayou, in a depth 100 feet deep or so, through the artificial material at the bottom of the bayou; the results's a similar deposit have been and when this was driven flowed out upon the and alluvium, probably also partly accelerated volume, and partly accelerated velocity.

A. I believe stopping that water was greater in the upstream stretch; in fact I stated in my examination in chief, and in reply to Mr. Smith's questions, that there was greater force, and even if they were 100 feet deep, it would not have anything to do with the preparation I have mentioned, as the present high flood waters not alone a little below the bayou proper, and it would also water not, in the other instance, the place was opposite.

Q. And the material would be carried and take the sediment mingled with the other material which would be transported by the running stream, and deposited at some point down below, and there wouldn't be any line of demarcation between the deposits made, between the two materials in the so-called so transported by the stream.

A. Yes at the upper end, but lower down, where the results would cease, have gone quite light, there would be that line of demarcation.

Q Do you mean that the two materials transported by the two streams would divide from each other?

A No, I mean this --

Q Something like water and oil?

A I do not; I mean that the finer materials of the ancient alluviums, if eroded, would be carried down the valley further, possibly towards the Santa Ana river, and some of them to the ocean, in those streams, and that the coarser would be left, and you would be unable to distinguish those from the recent alluviums.

Q Even then, you would have the finer material of your new alluvium mingling with the material of the old wouldn't you?

A It would; yet it would be a secondary deposit, because all deposits are classified by age, and they may come from the ancient alluviums and yet belong to the recent alluviums, if they were moved again since they were first laid down.

Q If you find that the stream then did come down from the mountain there, and is carrying out into the valley, a mixture of material of the old alluvium and the new alluvium, would you expect to find any sharp or well defined division line, between the two materials, anywhere in the valley, reached by the flow of the stream?

A After the old alluvium has been eroded and redeposited as recent alluvium, it becomes a part of the recent alluvium, the same as the metamorphic rocks in the San Gabriel mountains when they have been eroded and deposited in the recent times, they become recent alluvium.

Q I did not ask you anything about the metamorphic rocks; I asked you about the alluvium.

(Previous question and answer read.)

Mr. Pritt: I merely was asking the witness about the alluvium and he has gone on and made statement here about the metamorphic rock, about which I was not inquiring at all.

Mr. McKinley: I have no objection to that being stricken out about the metamorphic rock.

The Court: That will be stricken out.

Q. Now, that is your answer to the question is it, with that part stricken out?

A. Yes, sir; I simply used that as a simile to explain how the ancient alluvium might be converted into recent alluvium by re-erosion, and re-transportation, and re-deposition.

Q. Now, with all of that turned up strata there at the foot of the hills, ready to receive the water and to confine it in beds and veins prepared for it from the formation of the world, next to the foothills, wouldn't you have on your theory here, the same sort of upturned strata alongside of the fold which produced the Red Hill, or of which the Red Hill is a part?

A. You would have the same thing, only they would be folded reversely, so as to form an apex, with a declining dip on each side; whereas, at the foothills there would be an upward fold, but not a reverse fold forming an anticline.

Q. You have repeatedly taken a sheet of paper to illustrate this fold business: Now, I take this bunch of legal cap paper and I reduce it to a trough-like form, a semi-cylindrical form, a flattened cylinder, and we will call the left side as I hold it in my hands, the side next to the foothills, and the right side the side next to the Red Hills, there being

(Asking question and answer cross.)

CONFUCIUS: I merely was asking the minister about the situation and he just gave me that quite ridiculous bore about the mathematical rule, which I can not understand at all.

DR DOLITTLE: I have no opinion to take being neither circus nor mathematical rule.

THE SHAH: Doubtfully he artistic one.

C. Yes, that is your answer to the question is it, with that cool decision and?

A. Yes, sir; I simply used that as a sketch to explain how in a certain activity which is accurately and exactly situation by re-arranging, and re-transportation, and re-adjusting.

C. Yes, with all of that focused up which there is at the back of the hills, really is causing the water and re-arrangement in an circle and take movement. Is it that the Innumerable of the circle, most in the invisible, wonderful, you have an great theory here, the same work of upheaved there circumstance of the full which produced the bad hill, or of which the bad hill is a part?

A. You could have the same thing, only they would be taken vertically, as in in fact as case, with a definitely big or wide side; whereas the invisible have again to be upward tilt, but not a rather this forming as artificial.

C. I've been regularly taken a sheet of paper in illustrate this full business: See, I take this sheet of legal cap paper and I raise it as a hemisphere form, a semi-spherical form, a flattened cylinder, and he will not the left side as I hold it in my hands, but side-next to the invisible, and the right side for side next to the bad hills, there being

as you tell us a synchronous upheaval, haven't you got on the south side of your trough, the side next to the Red Hills the same exposed ends of your strata that you have on the side next to the mountains?

A No; because the ones next to the mountains were the limits of that formation, while on the righthand side the formation extended on, and there would be an extension of the fold, dipping again, after you pass over the apex.

Q How did that make any difference?

A It would simply cause - if you will hand me the paper I will fold it a little differently, and show you how it would: Now, this end would represent the upturned strata, up towards the mountains; then you have the bowl between, and the synclinal and the apex, where I have formed the ridge in the paper; the fold again dipping down, and extending down the valley toward the south.

Q Didn't you tell us that here at your anticline that they burst open?

A No, I didn't say that; I said that the porosity was increased by this fold, on the outside of the curve, but that they were fractured and offset and faulted I never said; I said there was an uplift and folding at that point, and the strata would extend further on down to the Santa Ana River; that was my meaning.

Q We understand you to say that you have on the mountain side the strata where it is completely exposed or upturned, and the raw edges stick up there, but on the Red Hill side, it was a smooth, gentle, unbroken undulation: That is your idea, is it?

A Precisely, because the upper end was the end of the formation,- was the limit of it; when the uplift occurred it simply had to turn those ends up and expose them; it could not fold them over, because they did not extend over the crest of the mountains.

Q Isn't it a hundred times more reasonable to say, if there is anything in your proposition about the uplift of the red formation by the rise of the mountain chain and the foothills, that instead of being thrust out here in a mass a half a mile to a mile thick, with upturned strata ready to entrap the water which came down from the mountains, that there would be fitst thrust out perhaps half an inch in a hundred years or other geological period a small portion of those strata constituting the older alluvium, and that it would be a narrow edge up at the mountains, and that the uplift would have take place very gradually? I ask you if that is not more reasonable than to suppose there was a sudden out-thrust of those older strata half a mile to a mile in width?

A That is a mixture of some things which are true, and some things which are wrong; that is not the way that this occurred or the way that geologists recognize that it has occurred.

Q I never heard of any geologist but you that said it occurred in that way.

A Mendenhall and others state that it occurred by a folding and the only way it could occur is by a folding and lateral pressure; as the ancient material ended at the foothills, it stands to reason as the mountain range rose, those ends would be upturned, and somewhat eroded, gradually exposed at the foothills; and the thickness of the ancient alluviums

are so great that I estimate the exposure, anywhere from a half a mile to a mile.

Q. With upturned strata ready to entrap the water?

A. The water would have to flow across the ends of the upturned strata, because the mountain range rose thousands of feet, and brought with it the old alluviums which were buried to an equal depth.

Q. Now, you said there was some truth in the assumptions which were contained in my question a few moments ago: in those days when the uplift was occurring, and when there were great rainfalls, and when the surface may have been as much inclined as it is now, or it may have been more or less, isn't it reasonable to suppose that as fast as the strata of the old alluvium were upturned, by reason of the extreme slowness with which it was thrust out, that it would be washed off,- the edge would be washed off and carried down the valley?

A. Near the foothills I believe that is true, and I have so stated,- that as the uplift occurred the flow of the flood water over the upturned ends would aid them some,- that is aid in making this exposure along the foothills.

Q. So that instead of there being any upturned strata there with edges so definite as to project there, prepared to catch and receive the water, isn't it a more reasonable supposition that the exposure of what you call the strata of the older alluvium, the exposure came so gradually that they were carried off down the valley, and that we have at the present time a figure, assuming the correctness of your theory, something like Mr Trask's section E here, where instead of there being a space a mile or a half a mile in width

prepared to receive the water as it comes down from the mountains and lock it up in ducts which have the imperviousness of lead pipe, that there is really on a sharp edge, joining the socalled newer alluvium at its place of contact with bedrock, the plutonic rock?

A No, sir; such an assumption would do violence to all reason, by assuming that you can take a stratum of the thickness of perhaps a mile, and whittle it down and make a sharp edge of it.

Q You could make a sharp edge of it, if you whittled it off as fast as you upturned it, couldn't you?

A It would be whittled off, but the ends would still be there upturned; instances of that can be seen in the Coast Range where the Strata are upturned and exposed in that way for a distance of a mile; the whittling off would not alter the fact that they would be upturned and ready to receive the water.

Q Don't you think those crevices would receive sand and silt and that they would become cemented up.

A I don't think they could become silted up by water from the water shed; they might receive it, but that wouldn't cement it.

Q You have a quantity of cemented ducts and veins running through that, so closely cemented, that it resists all sorts of hydraulic pressure; now, if you have your cementing material scattered through your older alluvium of such density and of such ductility, that it forms these veins and ducts, and it restrains the water so that it resists it even under great pressure, and does not allow it to escape, don't you

think if that same silt and sand would be taken into the open mouths of your upturned strata half a mile to a mile in width and make them impervious?

A No, sir; because the fine sands and silts do not deposit near the foothills; the velocity of the water is such that they are carried out further, and it is the coarser material that is deposited near the foothills. When you speak of these ducts being of fine material, it is only the walls of these ducts in the ancient formation that are fine material; and the reason that so much fine material was deposited in the ancient formation was not simply because the water was carrying it, but because the water was running on a flatter grade relative to the valley, and that would cause more of a deposit of the fine silts near the mountains.

Q Didn't hear you say yesterday that no one knows whether the mountain range during that period was higher or lower than it is at present?

A I didn't say that; Mr Haskell asked me whether it was ever higher at any time; I said during the recent period it is not definitely known whether the mountain range has been higher or not; I said in the pleistocene period it has been decided that the mountain range, has been two or three thousand feet lower.

Q Who knows it?

A Geologists who have studied the formations.

Q Do you know it?

A I do.

Q Do you know it most as well as any other thing you have testified to inxthis case?

A. I know it as well as anything else, from a scientific standpoint; you can read that in the reports of the Government, and books on geology; when you study the formations of the earth they are comparable to a book, and certain data is readable in the formations.

Q. Now, you have testified here several times that when water runs out here on the plains, in these channels for a year or two, that it cements the sides of the channel, and I think that is the way you illustrated the formation of these ducts and veins.

A. I don't think I used that method of illustrating their formation; I said the rainfall and runoff would bring down the coarse material in the channels and lay it in strata over the fine.

Q. Did you say anything about a channel, as the water flowed along in it, tending to cement the bottom of the channel?

A. That is in regard to the loss of water in the stream, running the distance from the canyon to the red hill; that a long period of flow in the same channel might so restrict the pore space as to make the loss about 25 percent of the whole stream; whereas, before the sediments could thus restrict the pore space, the loss might be very much greater; that was in another connection, and in regard to a matter on which we have experiments.

Q. If water thus flowing in a channel tends to cement the channel, then wouldn't your water which is flowing over the upturned ends of your strata cement the interstices or the leaf like joints, where the several strata are attingent to

each other and thus render the upturned edges impervious?

A. I have never seen a channel rendered impervious by a deposit of sediments; I have seen it so that the pore space might be restricted; and I don't wish to be understood as denying that sediments might have deposited which would tend to restrict the pore space in many parts of the deposit, both the ancient and the recent; but that any very great amount of fine sediments were laid down along the foothills I do not believe is a fact, as I think that the material laid down near the foothills is principally coarse, and that the deposit of sediments which interfere with the pore space and the absorption of water, while today do occur near the foothills, and have occurred in all ages, would not restrict it to such an extent as to form any cemented or impervious condition, but only a degree of lesser absorption.

Q. Ofcourse we know it is not sand and pebbles that cements a stream; you are talking about material and I am talking about process.

Mr McKinley: I don't think any cement was spoken of; I think the term used was silt.

A. When you use the word cementing I wouldn't want to agree to it, as that is not the proper expression.

Q. Haven't you talked about the cementing up of the beds and sides of these channels?

A. I think the expression I used, and which I wished to use is that of silting the beds of the channels.

Q. Well, that suits me just as well or even better, and possibly that is more accurate. The silt which causes the sides of the channel or stream to become impervious is not composed

of pebbles or boulders, or even large sand is it? It is virtually almost invisible, perhaps quite invisible, particles carried in suspension?

A. Sometimes there is pulverized silica and mica, and various fine powders which are called silts, in streams, as distinguished from the coarse sand and gravels.

Q. That is the material which does this work of silting up the bottom and sides of the channel, or cementing it, so that it becomes impervious to a degree/

A. Well, it doesnot cement it; it does tend to reduce the pore space by silting it up; and then you find even throughout the coarse deposit in the recent alluvium, that there is a certain percentage of silt in the coarsest deposit, and the degree to which it mingles determines the pore space, and the degree to which the pore space is diminished, and the absorbing ability of the water is restricted.

Q. At what point in the red formation did those veins that you speak of begin, those ducts? At the place where the water enters the upturned strata upon being received from the mountain? or from the canyon?

A. Their individual definition may not begin up as high as that, because even in the ancient alluvium, coarse material was laid down near the mountains , and there probably was not sufficient of the fine to cause the formation of those ducts right at the foot of the mountains; I would say these ducts might begin near GH, where you might expect more of the fine material was laid down originally.

Q. That line indicates the division between the two materials doesn't it, the two alluviums?

A That is as near as those ducts might reasonably be expected to begin, at the point where there is a division, because above that as you have said, and as I have said, there has been erosion, and there has been deposition, and there has been intermingling, and probably there is no defined or well formed boundary between the two formations.

Q Because of the intermingling of the two?

A Because of the erosion of one, and the deposit of the recent one above that line GH.

Q And that is where the ducts or veins begin?

A I would say the ducts begin at that point or thereabouts.

Q Then beginning there, there at the point of contact between the two alluviums, and the older alluvium being impervious, how would the water ever penetrate into the older alluvium.

A The strata or ducts are pointed upward, as the mouth of an inverted siphon above that line GH, and it is in that zone where the two are mingled so they can receive water; below that line they are separated by the Champlain deposit, and water from one will not communicate to the other.

Q The ducts in the upper part of their course are composed of the old alluvium and the new alluvium?

A No; I said there were no ducts up there.

Q Oh no, you didn't.

A I said it was a homogeneous mass above the line GH.

Q You told us that is where they begin, where the two formations are intermingled, and my inquiry was how do they get down into the old alluvium which is impervious? how does the water from those ducts, having a beginning in the

mingling of the two alluviums, manage to run down into the impervious old alluvium?

Now, Mr Britt, I think it is time to explain one or two things which you are overlooking, namely, at one time the old formation was all laid down level, and the ducts were then formed; that afterwards the folding took place, and that the ends of these ducts near the mountains were more imperfect than lower down; that they were there uplifted and somewhat eroded, and that over the uplifted ends was deposited the recent alluviums, and at that point, sowfar as the line of contact is concerned, it is very irregular, and there are no well formed ducts; but lower down where the intermingling did not take place, and where the old alluviums are still lying in situ, you will find the well formed ducts but bended in their course, in a ~~horizontal~~ vertical plane; the ~~horizontal~~ vertical plane is somewhat different from that in which they were originally formed.

They receive their water in the place where the two formations would intermingle?

Yes, sir; that is where they would receive their water; we would agree on that.

Here the Court takes a recess until tomorrow, April 14, 1909 at ten o'clock a.m.

-o-